ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY

A THESIS SUBMITTED TO BABA FARID UNIVERSITY OF

HEALTH SCIENCES, FARIDKOT (PUNJAB)

FOR THE PARTIAL FULLFILMENT

FOR THE AWARD OF DEGREE OF

DOCTOR OF MEDICINE

IN

ANAESTHESIOLOGY

(2023)

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DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled **"ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY"** submitted towards partial fulfillment of the requirements for the award of **MD IN ANAESTHESIOLOGY** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Udeyana Singh,** Associate Professor, Department of Anaesthesiology, **Dr. Anju Grewal,** Former Professor & Head, Department of Anaesthesiology, DMCH. No part of this thesis has formed the basis for the award of any degree previously.

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LIST OF ABBREVIATIONS

%	Percentage
ASA	American society of anaesthesiologist
BMI	Body mass index
CSEA	Combined spinal epidural anaesthesia
CH-R-	Carbohydrate rich
CD	Caesarean delivery
CHO	Carbohydrate
ERAS	Enhanced Recovery after Surgery
FFA	Free fatty acids
GA	General Anaesthesia
GH-V	Human growth hormone
HOMA-IR	Homeostatic model assessment of insulin resistance
LOS	Length of hospital stay
LSCS	Lower segment caesarean section
NIBP	Non-invasive blood pressure
NPO	Nil per oral
OT	Operation theatre
RBS	Random blood sugar
RCT	Randomized Controlled Trial
SAB	Sub-arachnoid block
VAS	Visual analog scale

ABSTRACT

Introduction-Starvation of long duration in pregnancy is associated with accelerated fasting which includes the development of hypoglycaemia, increased urinary nitrogen excretion, raised plasma levels of free fatty acids (FFA), and increased plasma and urinary ketones. Carbohydrate (CHO) rich drinks given preoperatively may ameliorate these deleterious effects. Many studies have observed the beneficial role of carbohydrate drink in elective gastrointestinal and hepatobiliary surgeries. However, evidence is scarce for a similar benefit in obstetric population.

Aim of Study: The aim of the study was to evaluate the role of preoperative carbohydrate (CHO) loading for the prevention of perioperative ketoacidosis in elective caesarean deliveries.

Materials & methods: A randomized study was conducted on 120 ASA II or III parturients undergoing elective caesarean section under subarachnoid block (SAB). Parturients were divided into two groups of 60 each. Group A: Parturients received 400ml of filtered water two hours prior to surgery. Group B: Parturients were given non particulate carbohydrate drink (0.5 grams per kg of Glucon-D powder formulated in 400 ml of filtered water) two hours prior to surgery.The incidence of ketonuria was studied as primary outcome in both the groups. Secondary outcomes included hunger and thirst scores, anxiety score on Modified Beck's anxiety scale, dominant hand grip strength using electronic hand dynamometer and Quality of recovery score postoperatively using ObsQoR-11 score. Results obtained were statistically analyzed.

Results: The urinary ketone levels did not show statistically significant difference. The hunger and thirst scores as well as the Modified Beck's anxiety scores were significantly higher in the water group. The dominant hand grip strength was preserved in both the groups without any significant difference. The quality of recovery score was significantly improved in the carbohydrate group.

Conclusion: Administration of oral carbohydrate drinks before surgery is safe before elective caesarean deliveries and may have a positive influence on a wide range of perioperative markers of clinical outcome.

Keywords: Carbohydrate drink, urinary ketosis, insulin resistance.

Dedicated

to

my family

&

Teachers

ACKNOWDEGEMENT

As I sit down to pen the conclusion to this thesis, memories flash in my mind and fill my heart with immense gratitude towards all those who, with their unending support and encouragement, have contributed in its successful completion and made this an unforgettable experience for me. At the onset of such major task, difficulties seemed insurmountable. First and foremost, praises and thanks to God, the almighty for his showers of blessings and being the guiding force through all ups and downs in this journey.

I would like to acknowledge and give my warmest thanks to my supervisor and mentor **Dr. Udeyana Singh** (Associate Professor, Department of Anaesthesia DMC&H, Ludhiana), who made everything seem so effortless. Her constant guidance and advise carried me through all the stages of writing this project. I am grateful to her for accommodating my queries and doubts with great patience at all times and offering her valuable suggestions. I will forever be indebted to mam for her innumerable efforts in making this thesis a success.

This thesis would have remained a dream had it not been for the scholarly guidance and constant encouragement of my co-supervisor, **Dr. Anju Grewal** (Former Professor and Head, Department of Anaesthesia, DMC&H, Ludhiana). She has always been an epitome of excellence for me. I acknowledge her endless help and interest at all stages of this project. Not only her motivation has played a great role in my career but her motherly love and care has made my residency a beautiful phase of my life.

I also extend my sincere and heartfelt gratitude to **Dr. Suneet Kathuria** (Head, Department of Anaesthesia, DMC&H, Ludhiana)and **Dr Shikha Gupta** who willingly and whole heartedly helped me in this study. Also, a big thank you to **Dr Rupinder Singh, Dr. Sandeep Kundra, Dr Kamakshi, Dr. Neeru, Dr. Namarta, Dr. Gurpreeti, Dr. Tanveer and Dr Richa Jain** for their unending support in the completion of my thesis.

Words fail miserably as I express my gratitude to my parents **Gian Inder Sharma** and **Rama Sharma** who are my ideal in everything. I feel blessed to call them my parents as whatever I am today is because of them. Their love, affection, selflessness, numerous sacrifices, unfaltering attention to my needs have made me a better person altogether.

I owe a big thanks to my best friend and husband, **Dr. Sahil Maingi** who has been a knight in shining armour for me. No one could help me more in writing down this thesis other than him. He has always been so supportive in whatever I do and has always been by my side at times when I needed him the most.

I also express my gratefulness towards my in laws **family Dr. Sukhdev Maingi, Dr. Madhu Maingi, Dr. Sajal Maingi** and **Dr. Pallavi** for their unending support. Their love, affection, encouragement and achievements have been a constant source of inspiration throughout the study. My life's major milestones will always be incomplete if I don't mention my brother **Mehtab**, sister **Sophiya**, her husband **Aayush** and my nephew **Ridhaan**. I feel so lucky to have such beautiful humans in my life. I thank them for helping me survive all the stress, not letting me give up and their blessings have made me whatever I am today. Last but not the least a big thanks to my best friends **Dr. Shruti, Dr. Shivi** and **Dr. Ritanshu** without whom I feel incomplete. Their constant motivation and love for me have been a driving force in completing this study.

I bow my head in sincerely acknowledging all my patients who consented to become the subjects of this thesis. Without their cooperation, this study would not have seen the light of the day. I also extend a vote of thanks to **Mr. Ravinder Singh** for his support during my thesis. A special thanks to **Mr. Naveen Bhatia** and **Mrs Ankush** at Research & Development Centre, DMC&H, Ludhiana for their sincere efforts in a fine reproduction of this work.

Dr. Ankita Sharma

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INTRODUCTION

The strict ‘nil-orally’ from midnight rule, before elective surgery was initiated to ensure an empty stomach at the time of induction of anaesthesia in order to reduce the risk of gastric regurgitation and pulmonary aspiration. Over the last decades several studies have questioned the requirement for such a prolonged pre-operative fasting period and have shown that not only can more liberal rules be applied while ensuring patient safety, but may also be of considerable benefit to the patient.

Patients are routinely fasted from midnight on the night before surgery despite ASA Guidelines recommending 8 hours of fasting for solids and 2 hours for clear liquids prior to elective surgeries. [1] Thus, patients invariably experience prolonged fasting resulting in catabolism, gluconeogenesis and rebound hyperglycaemia. During prolonged fasting, carbohydrate stores are rapidly depleted, leading to muscle catabolism, raised plasma free fatty acids and elevated urinary ketone body concentration.[2] Surgical stress also results in insulin resistance leading to an exacerbation of existing postoperative catabolic state with marked loss of body fat and protein stores.[3,4]

To provide carbohydrates through a more physiological route of administration, a carbohydrate-rich beverage that can safely be given shortly before surgery has been studied [5]. Intake of 400 ml (50 g carbohydrate) stimulates a release of insulin similar to that seen after a mixed meal (plasma concentrations: 60 mU/ml) [5, 6]. Osmolality is low (285 mosmol/kg), allowing a gastric transit time of 90 min for 400 ml [5].

In pregnant parturients, physiologic adaptations occur to ensure a proper balance between maternal plasma glucose levels and supply of glucose to the developing fetus. In a non-diabetic pregnant woman, third trimester fasting glucose levels are lower relative to

the pre-gravid state due to the dilutional effects of the increased maternal circulating blood volume and increased glucose use by the feto-placental unit. [7] Due to the relative decrease in fasting glucose levels, maternal insulin sensitivity decreases, hepatic gluconeogenesis increases, and fatty acid levels increase. Postprandial glucose levels are increased relative to pregravid levels in the setting of impaired insulin action due to human placental lactogen and other hormonal changes and inflammatory mediators, altered pancreatic insulin secretion, and increased hepatic gluconeogenesis. [8]

Pregnant females are particularly not suited for prolonged starvation periods since accelerated fasting occurs in the third trimester of pregnancy.Starvation of long duration is associated with the development of hypoglycaemia, increased urinary nitrogen excretion, raised plasma levels of free fatty acids (FFA), and increased plasma and urinary ketones. This set of events is referred to as "accelerated starvation" [9]. In addition, there is production of placental hormones including glucagon and human placental lactogen, which lead to insulin resistance by raising blood glucose metabolism and hence increasing the susceptibility to ketosis. [10]Postoperatively, mothers are recovering from a surgery along with breastfeeding their babies. Undertaking this stress in a carbohydrate depleted state leads to fatigue, negatively impacts cognitive functions, increases the risk of depression, worsens pain and may impair maternal- infant bonding. Hence, it affects the quality of recovery from the surgery and increases the length of hospital stay. [11]A careful balance should therefore be achieved between these two conflicting goals: ensuring an empty stomach at the time of surgery, whilst preventing the negative sequelae of prolonged fasting.

A major component of the Enhanced Recovery after Surgery programme (ERAS) is the preoperative anabolic loading of the

patient with a carbohydrate drink. ERAS involves various pre, intra and postoperative steps to reduce the normal stress response and organ dysfunction associated with surgical insult, with the ultimate aim of reducing time to full recovery. Preoperative carbohydrate intake has shown to reduce the catabolic response to surgery, reduce insulin resistance and postoperative hyperglycemia. [12] The rationale behind giving oral carbohydrate (CHO) preloading is three fold: to avoid dehydration before surgery [13] ; to allow safe general anaesthesia with an empty stomach, without the increased risk of pulmonary aspiration of gastric contents [5] ; to give a large enough carbohydrate load to allow the patient to be in a metabolically fed state before surgery, which has beneficial effects on reducing insulin resistance [14,15] and catabolism, and preserving muscle function as measured by grip strength [16,17].

Preoperative oral CHO consumption improves insulin sensitivity and decreases the time it takes for gut function to return without increasing gastric volumes or acidity compared to other clear liquids and fasting.[18-21] Previous research has shown that oral CHO consumption improves patient well-being to a greater degree than a placebo drink (water or flavored water) and fasted controls. [22] It also outperforms a similar volume of intravenous glucose supplementation. [23] These benefits have reduced hospital stays in a variety of surgical models by about 20%. [19, 20] Furthermore, preoperative CHO supplementation has been shown to reduce postoperative patient hunger, thirst, anxiety, fatigue, and nausea. [17] Interestingly, it has also been shown to improve cardiovascular function compared to fasting and placebo subjects in both animal and human models. [24]

The benefits of pre-operative carbohydrate loading have led to its incorporation in ERAS protocols of various specialities with maximum studies done on patients undergoing gastrointestinal surgeries. Yuill et al [25] conducted a prospective RCT done on 72

patients undergoing major elective abdominal surgery. These were divided into two groups, the control group received a placebo and the study group received an 800ml carbohydrate (CHO) drink on the preceding evening and a 400ml drink 2–3 hours prior to surgery. It was observed that there were no differences between the two groups at baseline for BMI, upper arm anthropometry or surgical procedure. At discharge loss of muscle mass (arm muscle circumference) was significantly greater in the control group when compared with the CHO group. Post-operative findings included insulin of 9.7 units in the control group compared with 17.4 units in the CHO group (indicating reduced insulin resistance in the carbohydrate group). The CHO group had a lower average hospital stay (8 days vs 10 days).

Noblett et al [17] conducted a randomized controlled trial on thirty-six patients undergoing elective colonic resection who were randomized into one of three groups. Group 1 were kept fasting; Group 2 were given pre-operative oral water, Group 3 received equivalent volumes of a Maltodextrin drink. Time to first flatus, first bowel movement and hospital stay were recorded. Musclestrength was measured pre-operatively, and on alternate days thereafter until discharge using a grip strength dynamometer. It was seen that the patients in the carbohydrate group had a median postoperative hospital stay of 7.5 days compared with 13 days in the water group and 10 days in the fasted group. The median time post-surgery to first flatus was 3 days for both the fasted and water groups compared with 1.5 days in the carbohydrate group. First bowel movement occurred on day 3 in the carbohydrate group, day 4 in the fasting group and day 5 in the water group. The fasted group showed a significant reduction in postoperative grip strength with a median drop of 10% at discharge.

DK Bilku et al [18] in a systemic review of 17 randomized controlled trials (RCT’S) comprising of 1445 patients undergoing

gastrointestinal, hepatobiliary, thyroid and parathyroid surgeries and found that the preoperative carbohydrate loading significantly improved insulin resistance and indices of patient comfort following surgery, especially hunger, thirst, malaise, anxiety and nausea. Following ingestion of carbohydrate drinks, no adverse events such as apparent or proven aspiration during or after surgery were reported.

Though many studies in non-obstetric population have shown the benefits of carbohydrate preloading, studies evaluating similar benefits in obstetric population are few in scientific literature.
Popivanov et al [26] conducted a study in 2019 to assess the gastric emptying of preoperative carbohydrate drinks in term parturients before elective caesarean delivery using ultrasonography. A total of 40 participants was analyzed. The primary outcome was the time taken for participants to return to a qualitative fasted Perlas grade of 0 (empty stomach) or 1 (negligible fluid 16-36ml). Secondary outcomes included quantitative antral cross-sectional area at 120 min and calculated gastric volumes. It was seen that 80% parturients attained Perlas grade 0 at 100 min of consuming the drink and thus considered at a low risk of gastric aspiration. Gastric emptying of this cohort of pregnant women suggested that 400 ml of a carbohydrate drink could be safely consumed upto two hours before elective surgery. Similar studies such as those conducted by P Van de et al [27] , CA Wong et al [28] , C Arzola et al [29] have shown that gastric emptying in pregnant patients is not different from that of non-parturients and that clear liquids upto 400ml can be safely given to uncomplicated parturients 2 hours prior to elective caesarean deliveries. [27-29]

A. Clark and K Litchfield et al [11] studied the effect of preoperative carbohydrate loading on 209 parturients scheduled for elective caesarean section. They randomized the subjects into two groups. Women in both groups received pre-operative fasting instructions

i.e. solids until midnight on the previous day and unlimited clear fluids overnight until 6hrs on the day of the delivery. Women in the carbohydrate (CHO) group received three sachets of preload, two to be consumed on the previous evening and the third at 6hrs on the day of the caesarean delivery. Each sachet of preload contained 47.5 g of carbohydrate in the form of dried glucose syrup derived from maize. The drink was prepared for consumption by dissolving the contents of each sachet in 400 mL of water. They observed that women receiving carbohydrate drink had a lower incidence (18.1%) of urinary ketones as compared to the group that was kept fasting which had a much higher incidence of urinary ketones (61.1%). Anxiety levels and hunger and thirst score were not significantly different.

This study was conducted on European females who are generally taller and have a higher body mass index (BMI). Modest data is available regarding similar benefit of oral carbohydrate supplementation in Indian population. Thus, it is important to study the role of carbohydrate drink on the Indian counterparts to know if limiting preoperative fasting with a carbohydrate drink might reduce postoperative catabolism, urinary ketosis improve post-operative muscle strength, decrease post-operative hunger and improve the quality of recovery of the parturient.

AIMS AND OBJECTIVES

To evaluate the role of preoperative carbohydrate loading on the perioperative ketoacidosis in elective caesarean deliveries.

REVIEW OF LITERATURE

Maternal adaptations occur in pregancy to ensure adequate shunting of glucose to promote fetal development while maintaining adequate maternal nutrition. During third trimester of pregnancy, despite increased glucose utilization by the feto-placental unit, maternal insulin sensitivity decreases. Elevated levels of the placental and non–placental derived hormones, particularly progesterone, cortisol, and growth hormone, lead to markedly decreased insulin sensitivity during the second and third trimesters of pregnancy, with the highest levels of insulin resistance occurring during the third trimester. [30]To compensate for these changes, both maternal hepatic gluconeogenesis and fatty acid levels increase. [8]

The stress response to surgery encompasses derangements of metabolic and physiological processes which induce perturbations in the inflammatory, acute phase, hormonal, and genomic responses. This results in hypermetabolism and hypercatabolism, leading to muscle wasting, impaired immune function and wound healing, organ failure, and death. [31] Postoperative insulin resistance is a well-characterized metabolic state that has been shown to correlate with an increased length of postoperative hospital stay. [3] Fasting decreases hepatic glycogen stores, induces a state of insulin resistance, and impairs cardiovascular function. [32] Nevertheless, prolonged preoperative fasting remains common, despite recent guidelines that recommend and encourage the intake of clear liquids up until 2 h before ‘surgery. [1]

In order to reduce deleterious effects of preoperative fasting, multiple studies were conducted to evaluate the effects of preoperative carbohydrate loading on the glucose metabolism as well as overall recovery of the patient.

In 2003 M. G. Henriksen, I. Hessov et al [16] studied the effects of preoperative oral carbohydrates and peptides on postoperative

endocrine response, mobilization, nutrition and muscle function in abdominal surgery. The aim of the study was to investigate whether oral carbohydrate or carbohydrate with peptide drinks preoperatively would improve postoperative voluntary muscle strength, nutritional intake and ambulation, decrease postoperative fatigue, anxiety and discomfort, and reduce the endocrine response to surgery. Forty-eight patients were included and randomized into three groups to receive 2, 400 ml of carbohydrate-rich drinks or to fast overnight and allowed only water. Voluntary grip and quadriceps strength, body composition, pulmonary function, VAS-score of eight parameters of wellbeing, muscle biopsies and insulin, glucagon, IGF-1 and free fatty acids were measured before and after the operation. The basic postoperative regimens for all groups were immediate oral nutrition and early enforced mobilization. Significant postoperative decrease in glycogen synthase activity in the muscle biopsies was observed in the intervention groups, and in combination, the intervention groups had a less reduced quadriceps strength after one week (10% vs. 16%) and one month (5% vs. 13%). Minor changes in the endocrine response to surgery were found without differences between the groups, and there were no differences between the groups in ambulation time, nutritional intake or subjective measures of wellbeing.

Monika Svanfeldt, Anders Thorell et al [33] in the year 2005 studied the Effect of preoperative oral carbohydrate treatment on insulin action in a randomised cross-over unblinded study in healthy subjects. Six healthy volunteers underwent hyperinsulinaemic (0.8 mU/kg/min), normoglycaemic (4.5 mmol/l) clamps and indirect calorimetry on four occasions in a crossover-randomised order; after overnight fasting (CC), after a single evening dose (800 ml) of the drink (LC), after a single morning dose (400 ml, CL) and after intake of the drink in the evening and in the morning before the clamp (LL). It was found that Insulin sensitivity was higher in CL and LL compared to CC and LC

In the same year (2005) Yuill et al [25] conducted an RCT to assess tolerance of preoperative carbohydrate fluid administration and to determine its effect on postoperative metabolic and clinical responses. This was a prospective RCT done on 72 patients undergoing major elective abdominal surgery. These were divided into two groups, the control group received a placebo and the study group received an 800ml carbohydrate (CHO) drink on the preceding evening and a 400ml drink 2–3 hours prior to surgery. The primary outcome was the nutritional status of the patient which was determined using body mass index (BMI) and upper arm anthropometry; all measurements were taken preoperatively, postoperatively and at discharge. Secondary outcomes included blood glucose and insulin concentrations measured preoperatively and on the first post-operative day, length of hospital stay (LOS) and postoperative complications.It was observed that there were no differences between the two groups at baseline for BMI, upper arm anthropometry or surgical procedure. At discharge loss of muscle mass (arm muscle circumference) was significantly greaterin the control group when compared with the CHO group. Post-operative findings included insulin of 9.7 units in the control group compared with 17.4 units in the CHO group (indicating reduced insulin resistance in the carbohydrate group). The CHO group had a lower average hospital stay (8 days vs 10 days).

In the following year 2006, Noblett et al [17] conducted a randomized controlled trial on thirty-six patients undergoing elective colonic resection to assess the effect of pre-operative carbohydrate administration on grip strength, gastrointestinal function and hospital stay following elective colorectal surgery. Patients were randomized into one of three groups. Group 1 were kept fasting; Group 2 were given pre-operative oral water, Group 3 received equivalent volumes of a Maltodextrin drink. Time to first flatus, first bowel movement and hospital stay were recorded. Muscle strength

was measured pre-operatively, and on alternate days thereafter until discharge using a grip strength dynamometer. It was seen that the patients in the carbohydrate group had a median postoperative hospital stay of 7.5 days compared with 13 days in the water group and 10 days in the fasted group. The median time post-surgery to first flatus was 3 days for both the fasted and water groups compared with 1.5 days in the carbohydrate group. First bowel movement occurred on day 3 in the carbohydrate group, day 4 in the fasting group and day 5 in the water group. The fasted group showed a significant reduction in postoperative grip strength with a median drop of 10% at discharge.

A similar study was conducted in 2007 by Yagci et al [34] in a randomized controlled trial (RCT) of 70 patients either undergoing a laparoscopic cholecystectomy or thyroidectomy. The aim of the study was to evaluate the effects of preoperative carbohydrate loading on the gastric contents of patients and perioperative metabolism. They divided them into two groups out of which one group was given 800 ml of carbohydrate drink one night before surgery and 400 ml of carbohydrate drink on the morning of surgery. The control group was on overnight fasting. The primary outcome was the comparison of gastric PH in both the groups and the secondary outcomes included the analysis of levels of glucose and insulin in both the groups. No difference was observed in gastric emptying times between the two groups. Gastric ph was also comparable for both the groups. Serum insulin levels were elevated in the study group indicating a better glycemic control in the study group.

This was supported by Mathur et al[35] who assessed the effect of oral carbohydrate (CHO) treatment on clinical outcome following major abdominal surgery in 2007. Primary outcomes were postoperative length of hospital stay and fatigue measured by visual analogue scale. They divided 69 and 73 in the CHO and placebo

groups respectively. Postoperative changes in fatigue score from baseline did not differ between the groups. Median (range) hospital stay was 7 days in the CHO group and 8 days in the placebo group. Patients who did not receive epidural blockade or laparoscopic surgery (20 CHO, 19 placebo), the length of stay was 7 and 9 days respectively.

DK Bilku et [18] al in the year 2014 did a systemic review of 17 randomized controlled trials (RCT'S) comprising of 1445 patients undergoing gastrointestinal, hepatobiliary or thyroid and parathyroid surgeries and found that the preoperative carbohydrate loading significantly improved insulin resistance and indices of patient comfort following surgery, especially hunger, thirst, malaise, anxiety and nausea. No definite conclusions could be made regarding preservation of muscle mass. Following ingestion of carbohydrate drinks, no adverse events such as apparent or proven aspiration during or after surgery were reported.

As has been shown by Brady et al[36], clear fluids are removed from the stomach within one hour (up to 90 min). Administration of clear liquids up to two hours before elective operations does not expose patients to greater risk of aspiration, regurgitation or related morbidity as compared to those fasted for 12 h or longer before surgery[13]. For this reason, anesthesiology societies issued recommendations that allow patients to drink an oral carbohydrate (CHO) drink. The procedure called "oral carbohydrate loading" typically allows the patient to drink a volume of 400–800 mL of CHO the night before surgery and a volume of 200–400 mL up to 2 h before elective surgery, with the exception of patients with risk of aspiration, e.g., with gastro-esophageal reflux or delayed gastric emptying (for any reason) [37-38].

Until now, these studies have excluded pregnant women due to the perceived risk of aspiration related to reduced lower esophageal

sphincter tone and delayed gastric emptying while in labor. However, the American College of Obstetrics and Gynecology Committee on Obstetric Practice[38] specifically states that “the patient without complications undergoing elective caesarean delivery may have modest amounts of clear liquids up to 2 h before induction of anesthesia,” which is congruent with the American Society of Anesthesiologists’ guidelines. Oral intake is part of enhanced recovery prior to surgery for caesarean deliveries. Early oral intake after caesarean delivery has been shown to improve maternal satisfaction without an impact on complications.A 2013 Cochrane review determined that there was no justification to restrict oral liquid or solid intake during labor in low risk women because there was no evidence to show harm, but there was conflicting evidence on types of carbohydrate solutions so further studies are needed. [39]

ERAS Guidelines for perioperative care in caesarean delivery [40] provide evidenced-based practice recommendations for preoperative, intraoperative, and postoperative phases and allow audit assessment and measurement of the desired outcome. These recommend that women should be encouraged to drink clear fluids (pulp-free juice, coffee, or tea without milk) until to 2 hours before surgery (Evidence Level: High/Recommendation Grade: Strong). (2) A light meal may be eaten up to 6 hours before surgery (Evidence Level: High/Recommendation Grade: Strong).Oral carbohydrate fluid supplementation, 2 hours before caesarean delivery, may be offered to nondiabetic pregnant women (Evidence Level: Low/Recommendation Grade: Weak).

P. Popivanov et al [26] conducted a study in 2019 to assess the gastric emptying of preoperative carbohydrate drinks in term parturients before elective caesarean delivery using ultrasonography. A total of 40 participants was analyzed. The primary outcome was the time taken for participants to return to a

qualitative fasted Perlas grade of 0 (empty stomach) or 1 (negligible fluid 16-36ml). Secondary outcomes included quantitative antral cross-sectional area at 120 min and calculated gastric volumes. It was seen that 80% parturients attained Perlas grade 0 at 100 min of consuming the drink and thus considered at a low risk of gastric aspiration. Gastric emptying of this cohort of pregnant women suggested that 400 ml of a carbohydrate drink could be safely consumed upto two hours before elective surgery.

A similar study was also conducted by Van de Putte, L. Vernieuwe et al [27] in 2019 who performed a cohort study to characterise prospectively the range of gastric-fluid volume in term non-labouring pregnant patients compared with a historical cohort of non-pregnant females. Fasted non-labouring term pregnant patients scheduled for elective caesarean delivery underwent a standardised gastric ultrasound examination. Gastric content was evaluated qualitatively (type of content), semiquantitatively (Perlas grades), and quantitatively (volume). Non-labouring pregnant (59) and non-pregnant (81) subjects were studied. It was found that the range of estimated total gastric fluid volume and volume per body weight was not significantly different between cohorts. An estimated volume of 115 ml vs 136 ml and volume per body weight of 1.4 ml/kg vs 2.0 ml/kg corresponded to the 95th percentile (95% confidence interval) values in the pregnant and non-pregnant cohort, respectively. Hence, the baseline gastric volume of non-labouring pregnant patients at term was not significantly different from that of non-pregnant females.
Thus, it could be concluded that gastric emptying in pregnant patients is not different from that of non-parturients and that clear liquids upto 400ml can be safely given to uncomplicated parturients 2 hours prior to elective caesarean deliveries.

A.Clark et al [11] did a randomized controlled trial in 2020 on 209 parturients undergoing elective caesarean section (104 in standard

care group and 105 in carbohydrate group). Women in both groups received pre-operative fasting instructions, i.e. solids until midnight on the previous day and unlimited clear fluids overnight until 6hrs on the day of the delivery. Women in the CHO group received three sachets of preload carbohydrate drink, two to be consumed on the previous evening and the third at 6hrs on the day of the caesarean delivery. The drink was prepared for consumption by dissolving 47.5grams of carbohydrate of each sachet in 400 mL of water.

The primary outcome was urinary ketone level, measured using reagent strips at the time of catheterization of urinary bladder prior to surgery. Secondary outcomes included dominant hand grip strength, anxiety score on Modified Beck anxiety scale, hunger thirst scores and length of hospital stay postoperatively.

It was observed that in the standard group 61% of the parturients had a positive urinary ketone test compared with 18% of the participants in the carbohydrate group. They suggested that women receiving carbohydrate drinks had a lower incidence of urinary ketones prior to caesarean deliveries.Anxiety levels and hunger and thirst score were not significantly different.

Similarly Wendling A. et al [7] assessed the impact of oral carbohydrate consumption prior to caesarean delivery on preoperative well being of the parturient in 2020. They recruited 47 low risk parturients scheduled for elective caesarean section under sub arachnoid block who were randomized into three groups. One group received a clearfast (high carbohydrate drink) beverage, the other received Gatorade (oral rehydration solution- low carbohydrate drink) beverage the night before surgery and 355ml 2 hours prior to surgery. Parturients in the control group were kept fasting after midnight. Patient well being was recorded using visual analogue scale 2 hours before surgery and repeated after an hour. Secondary outcomes included cord blood glucose level, intraoperative haemodynamics, breastfeeding success and a quality of recovery assessment administered one day after surgery. It was

observed that both the beverage consuming groups showed significant improvements in patient well being using visual analogue scales while control group showed no change. The group consuming higher dose carbohydrate beverage had lesser hunger scores as compared to oral rehydration beverage group. There was no difference in the cord blood glucose level as well as the cardiovascular function amongst the groups.

Yang C, Cheng Y [41] recently conducted an RCT in 2021 on the Effect of Preoperative Oral Carbohydrate Loading on Body Temperature during Combined Spinal-Epidural Anesthesia (CSEA) for Elective Caesarean Delivery. Women undergoing elective caesarean delivery were randomized into a control group (group C), an oral carbohydrate group (group OC), or an oral placebo group (group OP), with 40 women in each group. Core body temperature (Tc) and body surface temperature (Ts) before and after caesarean delivery, changes in Tc (ΔTc) and Ts (ΔTs), and the incidence of side effects (eg, intraoperative shivering) were compared amongst each groups. It was found that the postoperative Tc of group OC was higher than those of group C, and group OP. The ΔTc in group OC was significantly smaller than those in group C and group OP. Hence they concluded that oral carbohydrate loading 2 hours before surgery facilitated body temperature maintenance during CSEA for elective caesarean delivery.

In the same year Yuanhing et al [42] in a randomized controlled trial observed the impact of oral carbohydrate-rich (Ch-R) supplement taken 2 hours before an elective caesarean delivery (CD) on maternal and neonatal perioperative outcomes.The primary outcome was pregnant women's postoperative insulin resistance evaluated by the homeostatic model assessment of insulin resistance (HOMA-IR) index. Pregnant women's perioperative symptoms and signs (hunger and thirst scores, intraoperative nausea and vomiting, time of flatus after caesarean delivery and

body temperature) were also accessed as secondary outcomes.For neonatal outcomes, 1-min APGAR score and blood glucose level were recorded. Ninety pregnant women undergoing elective CD were randomized into the Ch-R group, placebo group and fasting group equally. Participants' blood was drawn at three time points, before intervention, immediately after and 1 day after the surgery to measure maternal and neonatal biochemical indices. Meanwhile women's perioperative symptoms and signs were recorded. It was found that women who had drunk Ch-R supplement had lower postoperative insulin level as well as postoperative HOMA-IR index compared with women who had fasted. Additionally, neonates of mothers who were allocated in the Ch-R group also had a higher glucose level, compared with neonates of mothers in the fasting group. Hence they concluded that Oral Ch-R solution administered 2 hours before an elective CD did not only alleviate maternal postoperative insulin resistance, but also comfort women's preoperative thirst and hunger, compared to fasting. Additionally, it may increase neonatal glucose level as well.

Taken together these studies suggest a beneficial role of the carbohydrate drink in improving the quality of recovery in patients undergoing surgery. But more study needs to be done in obstetric population regarding their metabolic response to the drink, perioperative hunger and thirst scores, preservation of postoperative muscle strength and faster recovery from the catabolic state associated with surgery.

MATERIALS AND METHODS

SOURCE OF DATA

A randomized study was conducted in the department of Anaesthesiology DMC&H Ludhiana after approval by Institutional Ethics Committee on a total of 120 parturients undergoing lower segment caesarean section (LSCS) under subarachnoid block (SAB), who were randomly allocated into two groups of 60 parturients each by computer generated randomized codes contained in sealed, sequentially numbered envelopes. A written informed consent was obtained from each patient

METHOD OF COLLECTION OF DATA

Inclusion Criterion

- American society of anaesthesiologists (ASA) physical status II and III undergoing elective lower segment caesarean section under subarachnoid block.
- Healthy singleton pregnancy
- Age more than 18 years.
- Weight 50-100kg

Exclusion Criterion

- Diabetic parturients
- Parturients with severe gastro-oesophageal reflux disease
- Parturients with failed subarachnoid block (SAB) or planned general anaesthesia (GA).
- Severe cardiovascular or cerebrovascular disease in mother
- Known fetal abnormality
- Anticipated excessive intraoperative blood loss.
- Patients with previous gastrointestinal surgery.

GROUP ALLOCATION

A total of 132 patients were recruited for the study. Out of these 12 were excluded from the study. 3 of them showed high RBS readings on multiple occasions; thus, raising doubt of undiagnosed gestational diabetes. 2 parturients went into labor and in 5 parturients there was delay of more than 4 hours after oral drink administration due to lack of operating room (OR) availability. 2 parturients withdrew consent. The remaining 120 parturients were randomly assigned equally into either of the 2 groups A and B by computer generated randomized codes contained in sealed, sequentially numbered envelopes, which were opened by an anaesthesiologist not involved in the study.

Group A: Parturients received 400ml of filtered water two hours prior to surgery.

Group B: Parturients were given non particulate carbohydrate drink (0.5 grams per kg of Glucon-D powder containing 99.4% glucose) formulated in 400 ml of filtered water two hours prior to surgery.

PREANAESTHETIC CHECKUP

A thorough pre anaesthesia checkup was done comprising of detailed history, comorbidities, allergy to any drug used, general physical and systemic examination. Detailed history was taken regarding diabetes and gastro-esophageal reflux disease.

Parturients were explained about the study being conducted and written informed consent was taken. All parturients were advised to be nil orally for 8 hours for solid prior to scheduled time of surgery. Blood sugar was measured immediately before giving the drink.

Parturients in group A were given 400ml of filtered water as placebo two hours prior to surgery. While parturients in group B were given 0.5gram/kg of carbohydrate in the form of a drink which will be formulated by adding the Glucon-D powder (as calculated) in 400ml of filtered water to make a clear drink. They were asked to consume

it within half an hour, two hours before entering the operation theatre. This administration of either filtered water or carbohydrate drink was supervised or monitored by the attending anaesthesiologist. After the administration of the oral drink an 18G iv cannula was secured and balanced salt solutions were initiated.

Anxiety score was measured in all the parturients on a Modified Beck Anxiety Scale [43] immediately before entering the operation theatre (OT).

Hunger and thirst scores were also assessed prior to entry into the OT on a Numeric rating scale(NRS) by asking the parturient to rate hunger/thirst on a scale of 0-10; 0 being no hunger or thirst and 10 being hungriest or thirstiest they had ever felt.

Dominant hand grip strength was measured by taking the mean of three readings using an electronic dynamometer (Camry 200lbs or 90kgs digital hand dynamometer) immediately prior to entering the operating room. Random blood sugar (RBS) was also measured again at this time.

ANAESTHESIA TECHNIQUE

On arrival in the operating room parturient was positioned on the operating table in supine position with a 15-30 degree left lateral tilt. Monitors were placed in the form of pulse oximeter, noninvasive blood pressure (NIBP) and a five lead ECG. Heart rate was recorded using 5 lead electrocardiography and noninvasive blood pressure using an automated noninvasive device was cycled every 1 min till three consecutive measurements of systolic blood pressure were recorded with a difference of not more than 10%. We then calculated the mean value of 3 values of heart rate and blood pressure and SpO_2 which was defined as baseline value.

Parturients were then positioned in sitting or lateral position for subarachnoid block. After full aseptic precautions and skin infiltration with lignocaine hydrochloride 2% (w/v), a 26G Quincke's

needle was inserted in L3-L4 or L4-L5 vertebral interspace. After confirmation of free flow of cerebrospinal fluid, a total of 2.5 ml of drug comprising of 2ml (10mg) of hyperbaric bupivacaine and 0.5ml (25mcg) of fentanyl was injected intrathecally.

Parturient was then catheterized with foley's catheter and 5ml of urine was collected to assess the urinary ketone levels using reagent strips (Mission urinalysis reagent strips) or dipstick method, which was documented.

After a sensory level of T4 was achieved, as assessed by hot or cold method, surgery was allowed to proceed. Systolic blood pressure was maintained within 5% of baseline value at all times during surgery with a combination of fluid coloading with balanced salt solutions 10ml/kg over 5-10 minutes and phenylepherine 50mcg or ephedrine 6mg boluses intravenously at the discretion of attending anaesthesiologist.

Non-invasive blood pressure, heart rate, SpO_2 reading was measured every one min till the delivery of the baby and thereafter every 5 min till the skin closure.

At the end of the surgery, the surgical incision was infiltrated with 40ml of 0.2% Ropivacaine (isobaric). Post-operative analgesia regimen consisted of:-

-Injection tramadol 1-1.5mg/kg intravenously every 8 hours.

-Injection paracetamol 10mg/kg intravenously 6 hourly infused over 15 minutes.

-Diclofenac patch 200mg (Nupatch200) applied over the abdomen

-Any breakthrough pain was treated by injection fentanyl 2ug/kg intravenously.

RBS was measured again immediately after shifting the parturient to the recovery.

Postoperatively Quality of recovery score was measured after 24hours of the surgery using ObsQoR-11 score. [44]

Muscle strength was measured using hand dynamometer 24 hours postoperatively.

PRIMARY OUTCOME:

Primary outcome was the measurement of urinary ketone levels using reagent strips as a marker of postoperative catabolic state.

SECONDARY OUTCOMES:

- Hunger and thirst scores immediately before entering the operative room
- Anxiety score on Modified Beck's scale.
- Dominant hand grip strength using electronic dynamometer.
- Quality of recovery score postoperatively using ObsQoR-11 score

STATISTICAL ANALYSIS

The statistical analysis was carried out using IBM SPSS (Statistical Package for Social Sciences) statistical version 20. The analysis included frequency table, bar, pie chart, association of variables based on Chi-square and Fisher's exact test and risk ratio estimates with 95% Confidence Interval. All quantitative variables were estimated using measures of central location (mean and median) and measures of dispersion (standard deviation). Normality of data was checked by Kolmogorov Smirnov test. For normality distributed data, Mean was compared using the t-test and One way ANOVA. For not normality distributed data, Median compared using the Mann Whitney U test and Kruskal Wallis test. All statistical tests were seen at two-tailed level of significance ($p \leq 0.01$ and $p \leq 0.05$).

SAMPLE SIZE

Sample size was estimated from the results of previous study [11] using the incidence of Urinary Ketone levels as the parameter, which was the primary outcome of our study. This utility calculates the sample size required to estimate a proportion (18%) with a specified level of confidence and precision. The sampling technique used in the study was convenient sampling.

$n = (Z^2 \times P(1 – P))/E^2$

n=116 (approximately)

Where Z = value from standard normal distribution corresponding to desired confidence level (Z=1.96 for 95% CI)P (.18) is expected true proportion
E (.07) is desired precision.

Total Sample Size =120

OBSERVATIONS AND RESULTS

The present randomized control study was conducted in a prospective manner in the department of Anesthesiology, DMCH Ludhiana on a total of 120 patients scheduled for elective caesarean delivery under SAB belonging to ASA grade II& III.

The study aimed to evaluate the role of preoperative carbohydrate loading on the perioperative ketoacidosis in elective caesarean deliveries. The following outcomes were noted:

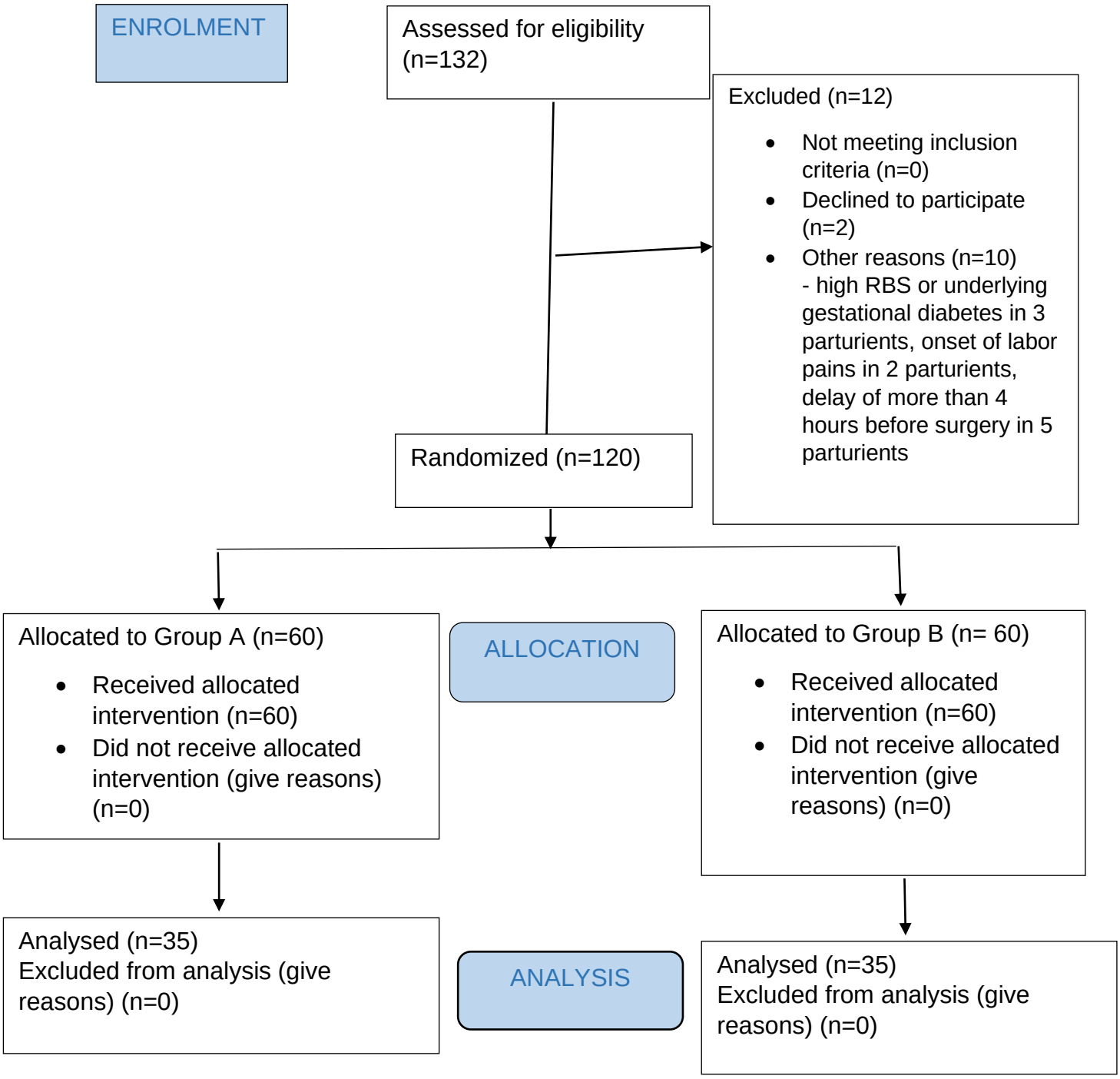
PRIMARY OUTCOME:

Measurement of urinary ketone levels using reagent strips as a marker of postoperative catabolic state.

SECONDARY OUTCOMES:

- Hunger and thirst scores immediately before entering the operative room
- Anxiety score on Modified Beck's scale.
- Dominant hand grip strength using electronic dynamometer.
- Quality of recovery score postoperatively using ObsQoR-11 score

FIGURE 1: CONSORT Flow Diagram of the study


ENROLMENT
Assessed for eligibility (n=132)
Excluded (n=12)
Not meeting inclusion criteria (n=0)
Declined to participate (n=2)
Other reasons (n=10)
- high RBS or underlying gestational diabetes in 3 parturients, onset of labor pains in 2 parturients, delay of more than 4 hours before surgery in 5 parturients
Randomized (n=120)
Allocated to Group A (n=60)
Received allocated intervention (n=60)
Did not receive allocated intervention (give reasons) (n=0)
ALLOCATION
Allocated to Group B (n= 60)
Received allocated intervention (n=60)
Did not receive allocated intervention (give reasons) (n=0)
Analysed (n=35)
Excluded from analysis (give reasons) (n=0)
ANALYSIS
Analysed (n=35)
Excluded from analysis (give reasons) (n=0)

A total of 132 patients were recruited for the study. Out of these 12 were excluded from the study. Three (3) of them showed high RBS readings on multiple occasions; thus, raising doubt of undiagnosed gestational diabetes. Two (2) parturients went into labor and in 5 parturients there was delay of more than 4 hours after oral drink administration due to lack of operating room (OR) availability. Two (2) parturients withdrew consent. The remaining 120 parturients were randomly assigned equally into either of the 2 groups A and B by computer generated randomized codes contained in sealed, sequentially numbered envelopes.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE PATIENT: DISTRIBUTION OF SUBJECTS ACCORDING TO AGE, HEIGHT AND WEIGHT

	Water Group		Carbohydrate Group (CHO)		t	p-value
	Mean	SD	Mean	SD		
AGE	29.72	4.29	30.07	4.69	-0.427	0.670
HEIGHT CM	159.35	4.15	159.17	4.22	0.240	0.811
WEIGHT KG	72.48	6.50	72.84	7.56	-0.278	0.781

Mean age in water group was 29.72±4.29 years and in CHO group it was 30.07± 4.69 years. Mean height in Group A was 159.35±4.15 cm and in group B it was 159.17±4.22cm. The mean weight was 72.48±6.50kg and 72.84±7.56 in water group and CHO group respectively. Both the groups were statistically comparable with respect to the demographic data.

FIGURE 2a: DISTRIBUTION OF SUBJECTS ACCORDING TO AGE

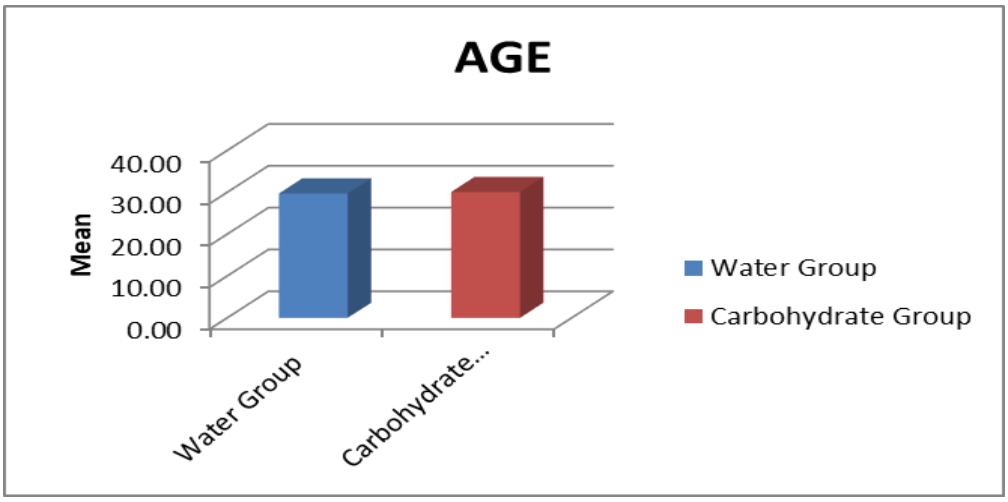


FIGURE 2b: DISTRIBUTION OF SUBJECTS ACCORDING TO HEIGHT

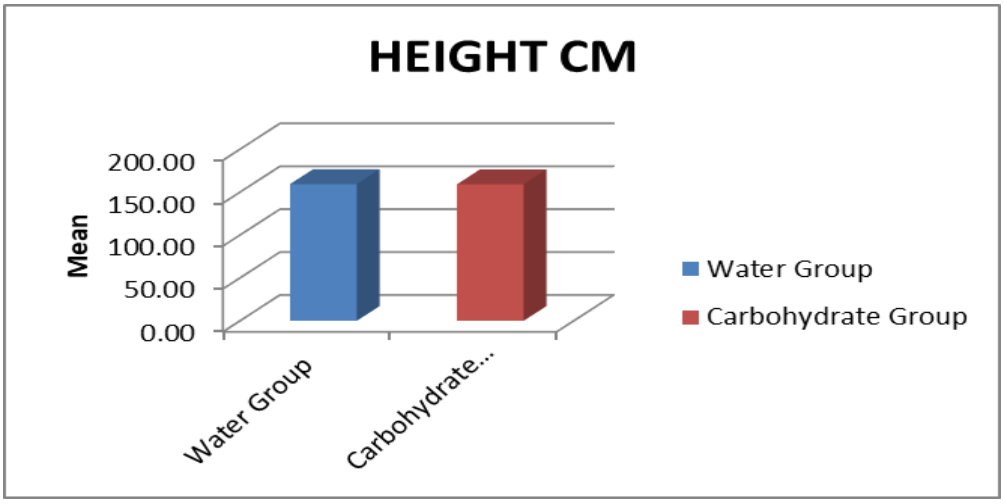


FIGURE 2c: DISTRIBUTION OF SUBJECTS ACCORDING TO WEIGHT

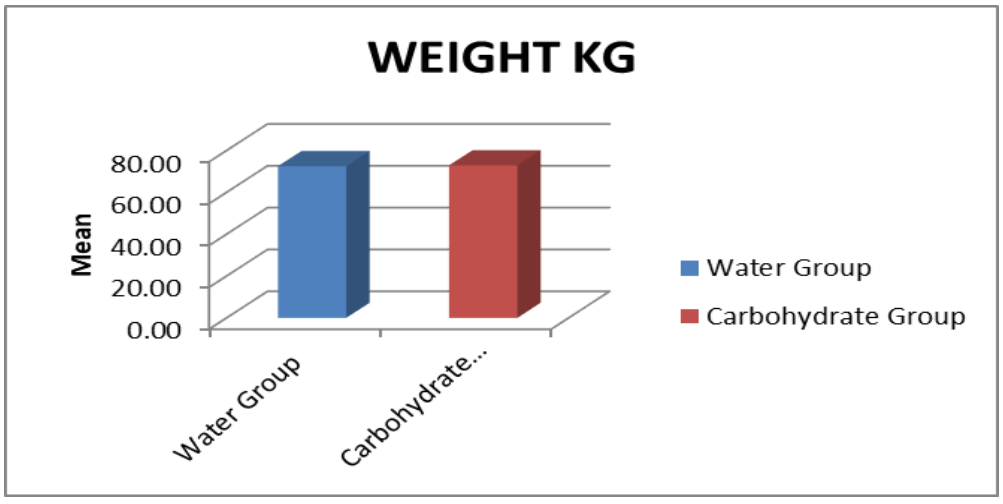


TABLE 2 : ASA STATUS

		Water Group		Carbohydrate Group (CHO)		Total	Chi-square value	p-value
		No. of cases	%age	No. of cases	%age			
ASA Grade	II	53	88.3%	54	90.0%	107	0.086	0.769
	III	7	11.7%	6	10.0%	13		

In water group, 88.3% patients belonged to ASA II physical status and 11.7% belonged to ASA III. In CHO group, 90% patients belonged to ASA II and 10% belonged to ASA III. Thus both the groups had similar distribution of ASA physical status II and III and were statistically comparable.

FIGURE 3: DISTRIBUTION OF SUBJECTS ACCORDING TO ASA GRADE

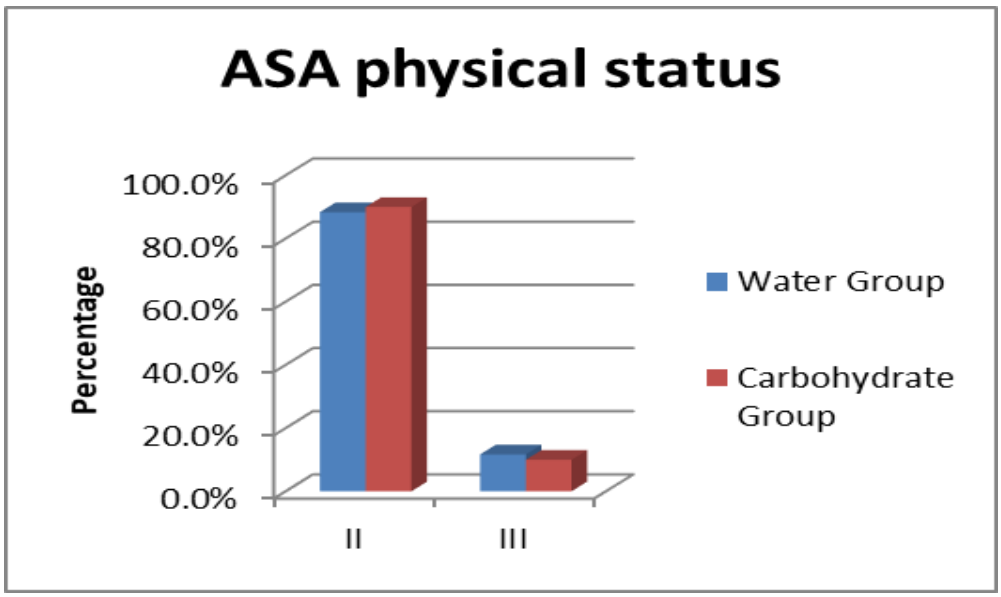


TABLE 3: DURATION OF FASTING

	Water Group		Carbohydrate Group		Z	p-value
	Mean	SD	Mean	SD		
Duration of fasting (hours) SOLIDS	10.58	1.69	10.48	1.92	-0.529	0.597
Duration of fasting (hours) FLUIDS	2.48	0.49	2.72	0.70	-1.677	0.093

The mean duration of fasting for solids in water group was 10.58±1.69 hours and 10.48±1.92 hours in carbohydrate group. The mean duration of fasting for fluids was 2.48±0.49 hours and 2.72±0.70 hours in water and carbohydrate group respectively. The duration of fasting for both solids and liquids was comparable in both the groups.

FIGURE 4a: DURATION OF FASTING (HOURS) SOLIDS

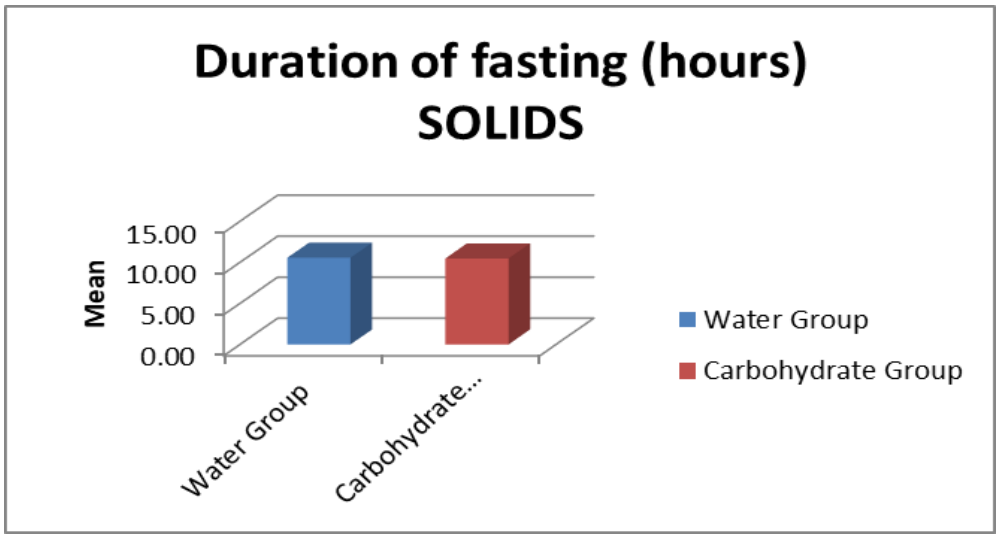


FIGURE 4b: DURATION OF FASTING (HOURS) FLUDIS

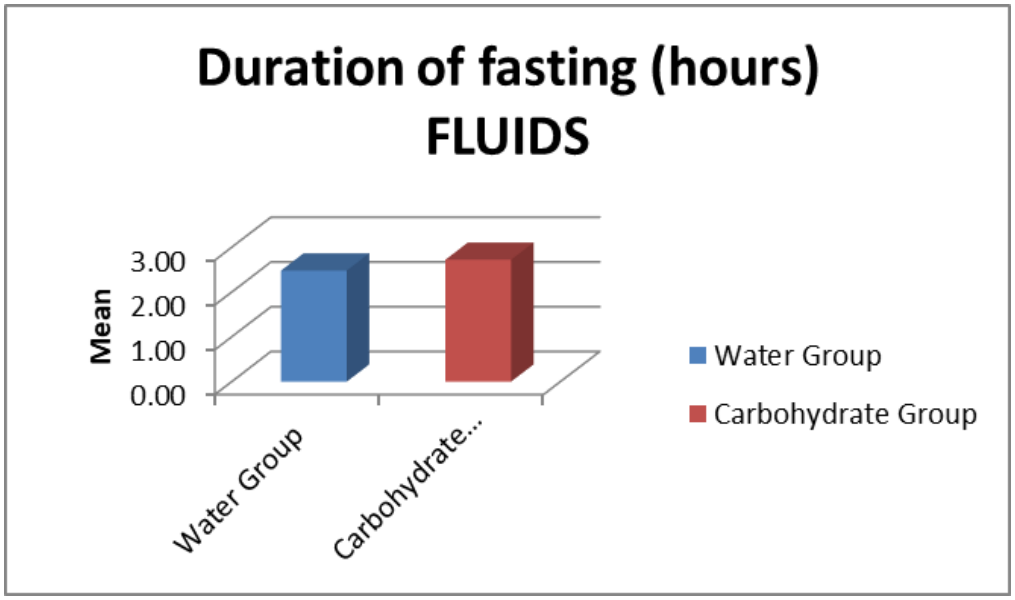


TABLE 4: MEAN RBS IN BOTH THE GROUPS:

	Water Group		Carbohydrate Group		Z	p-value
	Mean	SD	Mean	SD		
RBS before drink	99.97	15.19	97.32	12.62	1.039	0.301
RBS immediate pre-op	99.65	14.67	95.70	11.62	1.635	0.105
RBS immediate post-op	98.37	15.04	94.27	10.48	1.733	0.086

There was no statistically significant difference in the mean RBS in both the groups at all times during the study; before administration of the drink, immediate pre-operatively as well as immediate post-operatively.

FIGURE 5: RBS AT VARIOUS TIMES (MG/DL)

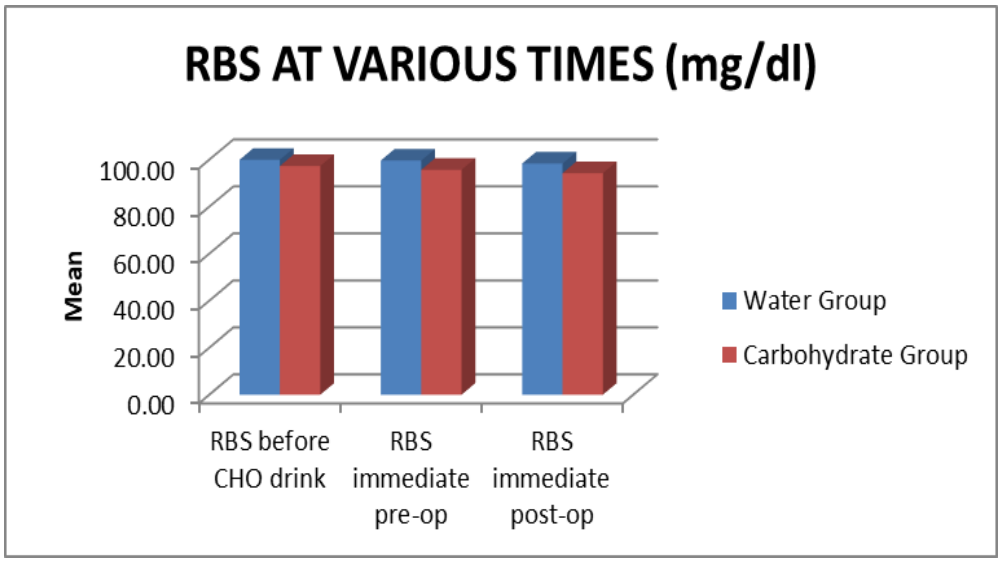


TABLE 5: HUNGER AND THIRST SCORE AND BECK'S ANXIETY SCORE:

	Water Group		Carbohydrate Group (CHO)		Z	p-value
	Mean	SD	Mean	SD		
Hunger and thirst score	5.63	2.69	4.20	2.35	3.107	0.002
Modified Beck's anxiety score	24.45	8.33	19.40	7.50	3.491	0.001

The hunger and thirst scores were significantly higher in water group 5.63±2.69 than the carbohydrate group 4.20±2.35 (p=0.002)

The Modified Beck's anxiety score was also higher in water group (24.45±8.33) in comparison to CHO group (19.40±3.49). This was statistically significant with a p value of 0.001.

FIGURE 6a: HUNGER AND THIRST SCORE

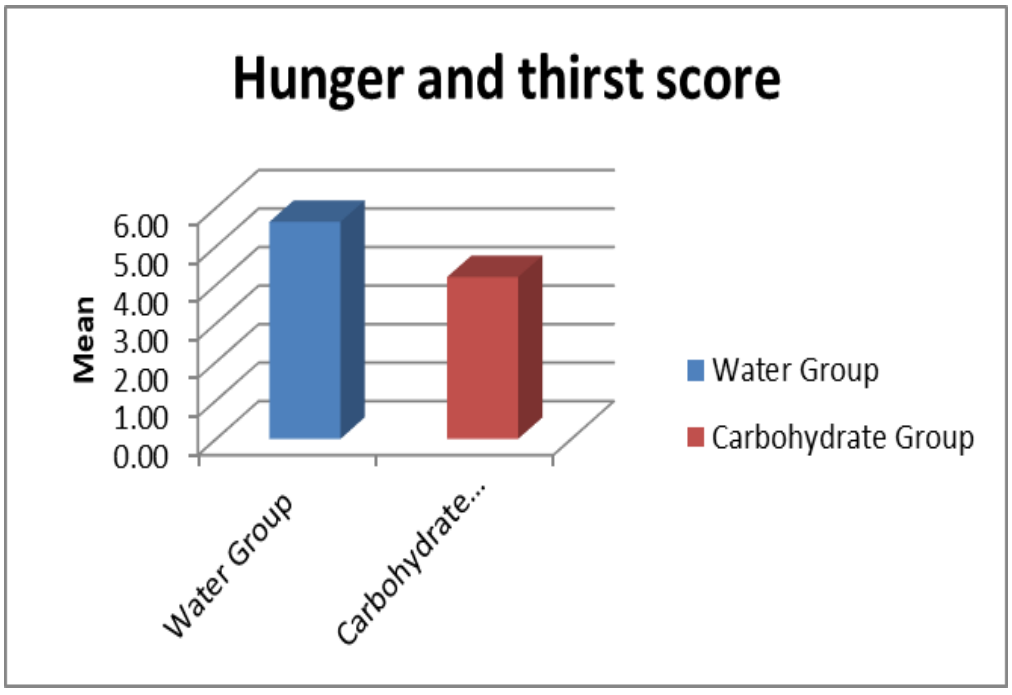


FIGURE 6b: MODIFIED BECK'S ANXIETY SCORE

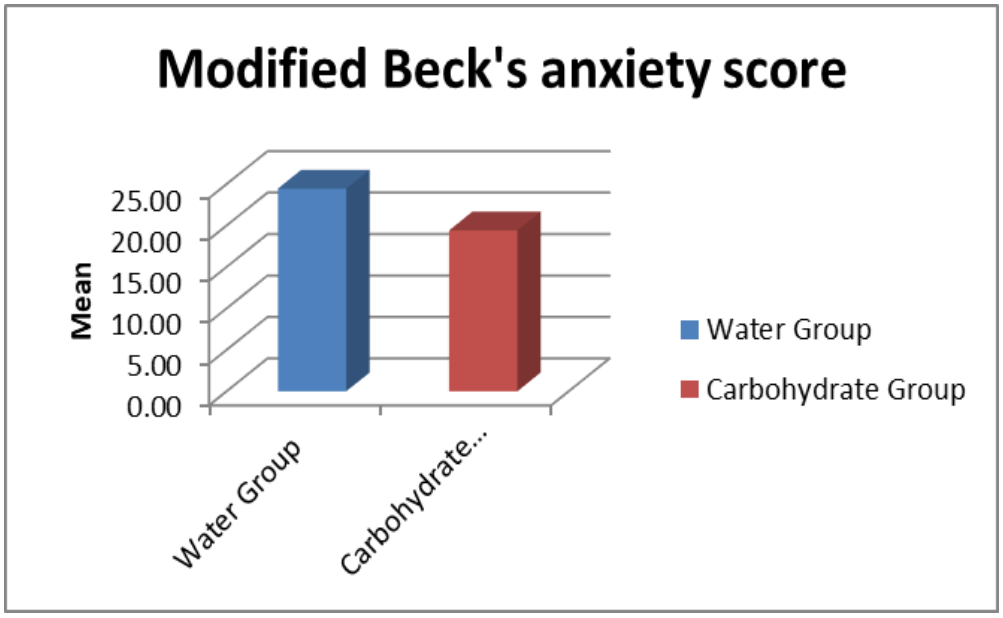


TABLE 6: URINE KETONE LEVELS

		Water Group		Carbohydrate Group		Total	Chi-square value	p-value
		No. of cases	%age	No. of cases	%age			
Urine ketone levels	1+	5	8.3%	1	1.7%	6	2.807	0.094
	negative	55	91.7%	59	98.3%	114		

The urine ketone levels were 8.3% positive (+1) in water group and 1.7% positive (+1) in carbohydrate group. The difference between the groups was not statistically significant.

FIGURE 7: URINE KETONE LEVELS

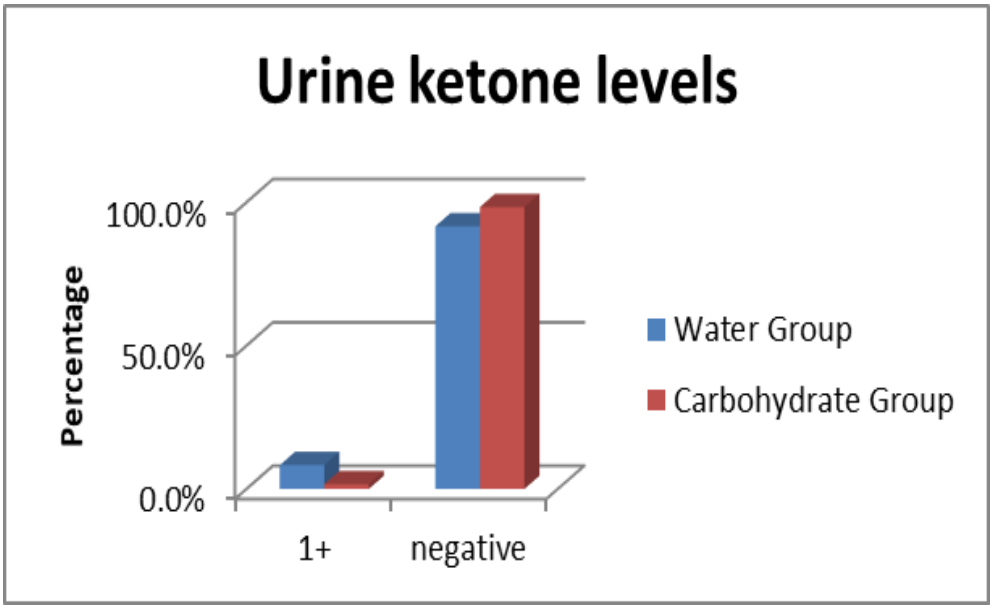


TABLE 7: DOMINANT HAND GRIP STRENGTH PRE-OPERATIVELY:

	Water Group		Carbohydrate Group		Z	p-value
	Mean	SD	Mean	SD		
Dominant hand grip strength reading 1	26.69	8.10	26.29	9.22	0.250	0.803
Dominant hand grip strength reading 2	26.59	9.10	26.48	10.02	0.065	0.948
Dominant hand grip strength reading 3	27.52	9.05	26.94	9.87	0.335	0.739
Mean of dominant hand grip strength (kg)	26.91	8.52	26.55	9.53	0.219	0.827

The mean dominant hand grip strength taken just before taking the patient to the operating room showed no statistical difference in both the groups with mean hand grip strength of 26.91±8.52 in water group and 26.55±9.53 in carbohydrate group.

FIGURE 8: DOMINANT HAND GRIP STRENGTH PRE-OPERATIVELY

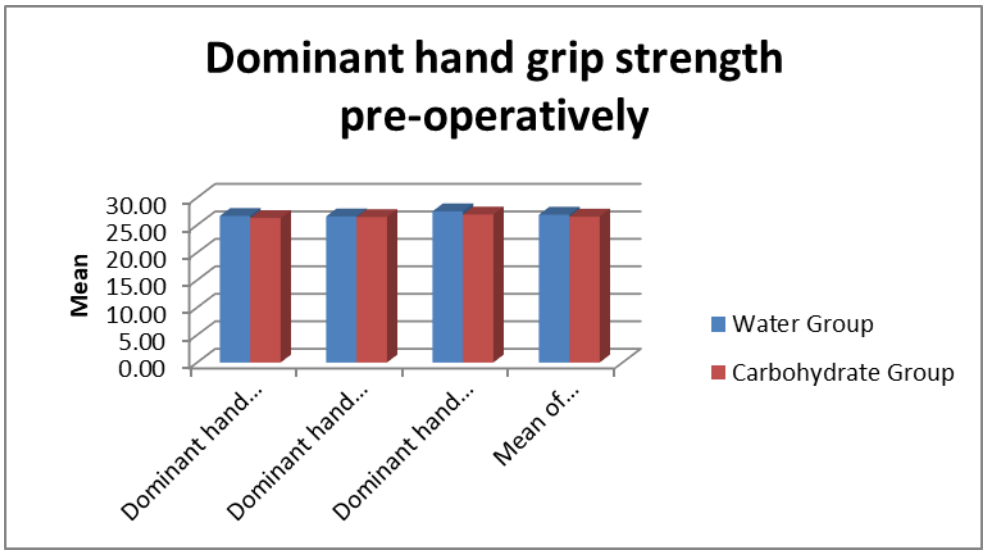


TABLE 8: BASELINE VITAL PARAMATERS:

HR mean	98.35	11.03	95.08	11.84	1.558	0.122
SBP mean	128.45	10.44	125.17	11.49	1.631	0.106
DBP mean	82.17	7.50	79.08	6.95	2.326	0.022
SpO2 mean	98.48	1.26	98.75	0.60	-1.449	0.150

The baseline vital paramaters i.e. heart rate, systolic blood pressure, diastolic blood pressure and oxygen saturation were comparable in both the groups.

FIGURE 9a: INTRA-OPERATIVE HEART RATE

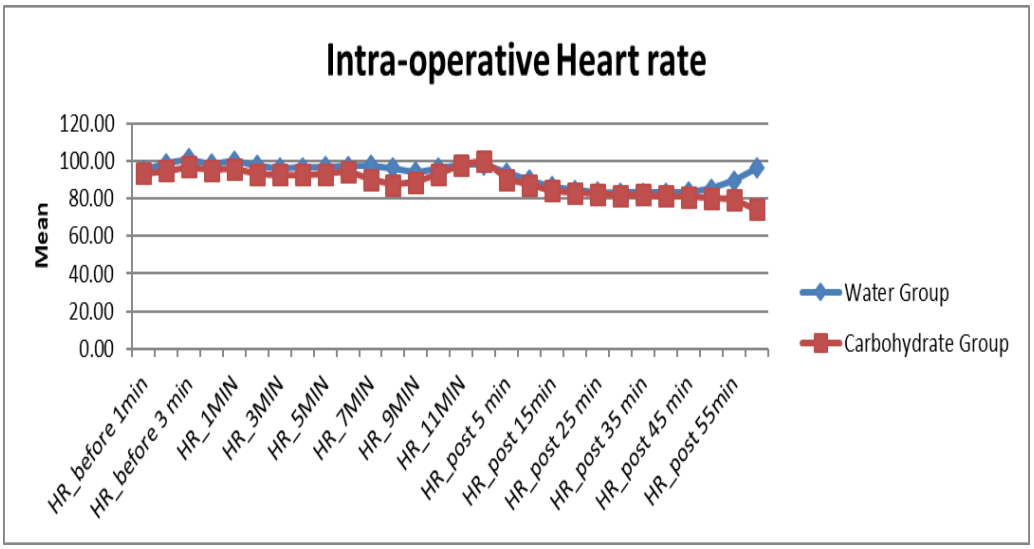


FIGURE 9b: INTRA-OPERATIVE SYSTOLIC BLOOD PRESSURE(SIBP)

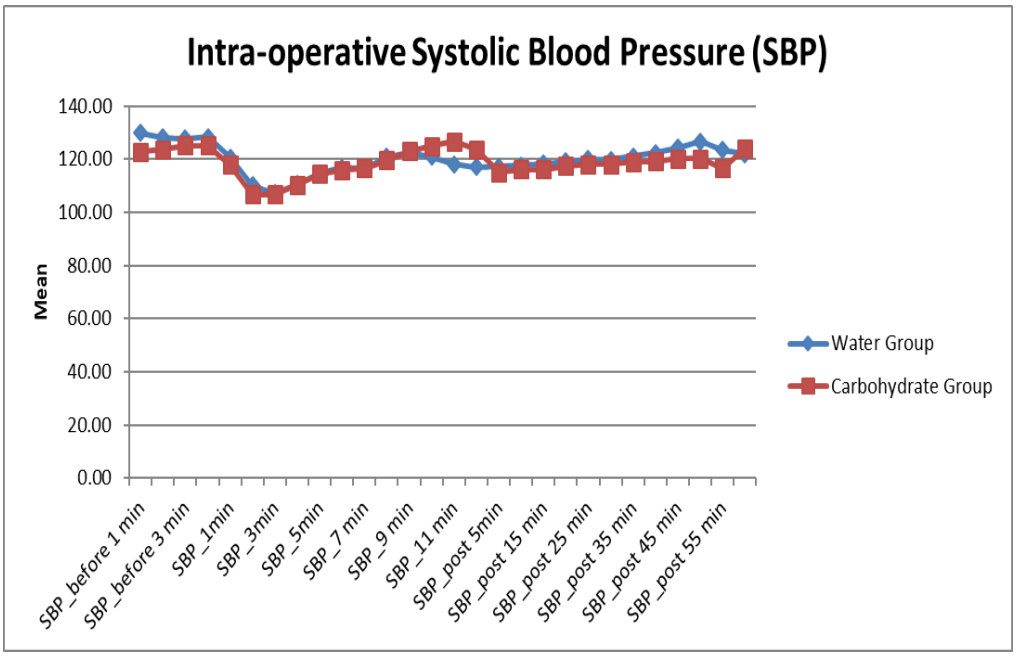


FIGURE 9c: INTRA-OPERATIVE DIASTOLIC BLOOD PRESSURE(DIBP)

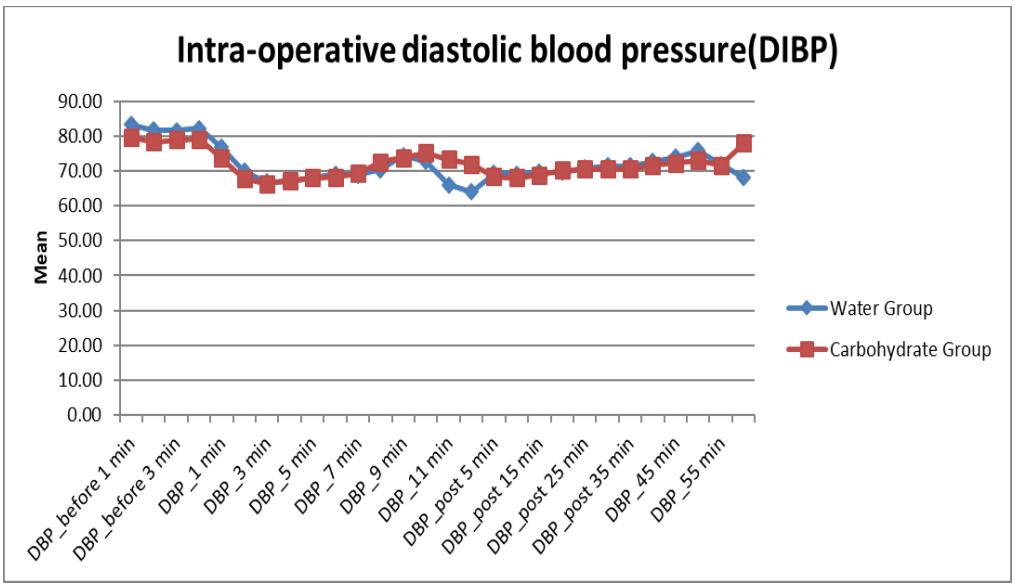


FIGURE 9d: INTRA-OPERATIVE OXYGEN SATURATION(SpO_2)

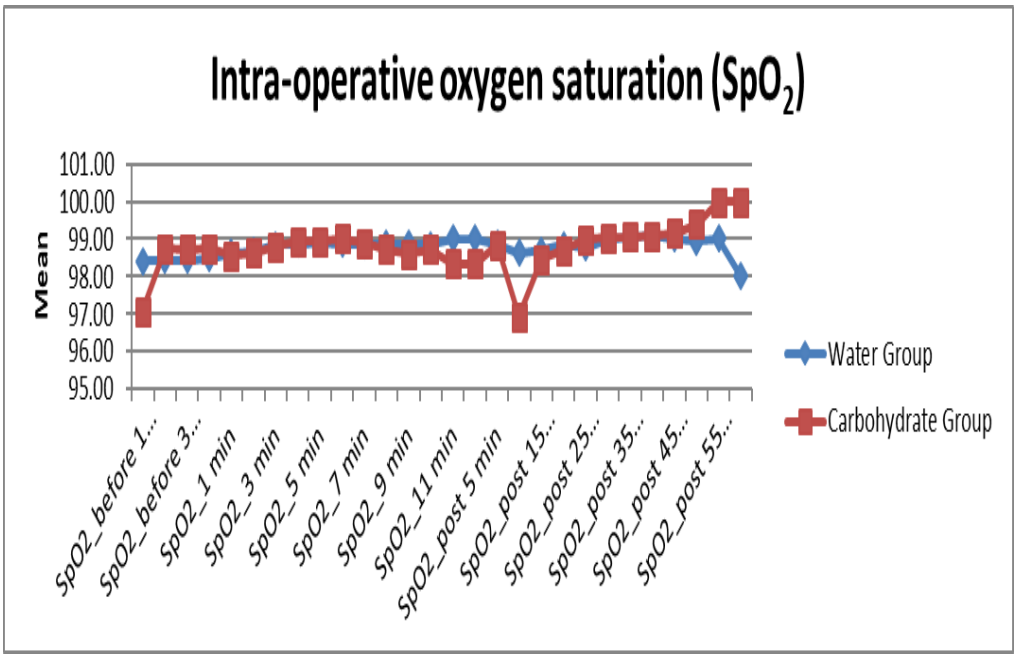


TABLE 9: NUMBER OF EPISODES OF HYPOTENSION

		Water Group		Carbohydrate Group		Total	Chi-square value	p-value
		Water Group	Water Group	Carbohydrate Group	Carbohydrate Group			
Number of episodes of hypotension	1	23	38.3%	26	43.3%	49	2.209	0.530
	2	12	20.0%	12	20.0%	24		
	3	6	10.0%	2	3.3%	8		
	none	19	31.7%	20	33.3%	39		
Total		60	100.0%	60	100.0%	120		

The number of episodes of hypotension were comparable in both the groups.

FIGURE 10: NO. OF EPISODES OF HYPOTENSION

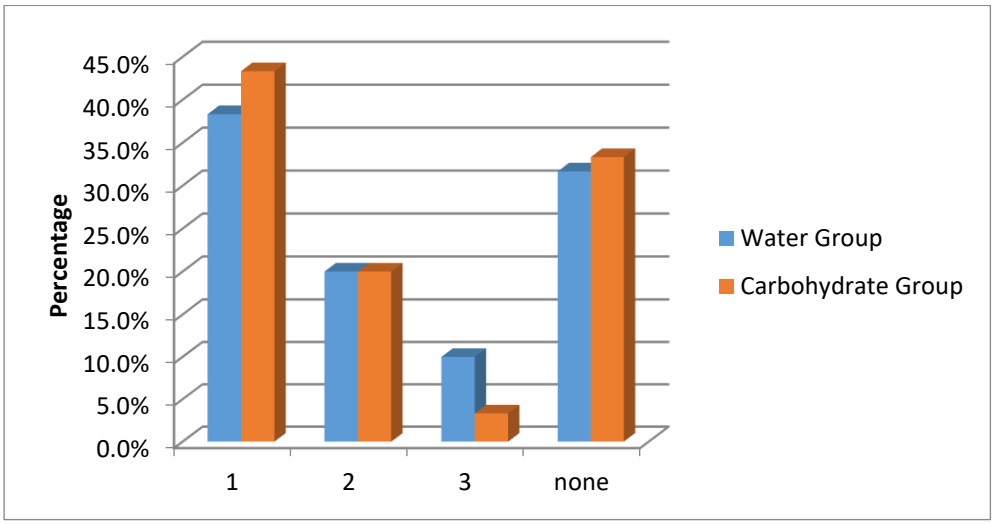


Table10: NUMBER OF EPISODES OF HYPERTENSION

		Water Group		Carbohydrate Group		Total	Chi-square value	p-value
		Water Group	Water Group	Carbohydrate Group	Carbohydrate Group			
Number of episodes of hypertension	1	3	5.0%	0	0.0%	3	3.077	0.244
	none	57	95.0%	60	100.0%	117		
Total		60	100.0%	60	100.0%	120		

The numbers of episodes of hypertension were comparable in both the groups.

FIGURE 11: NO. OF EPISODES OF HYPERTENSION

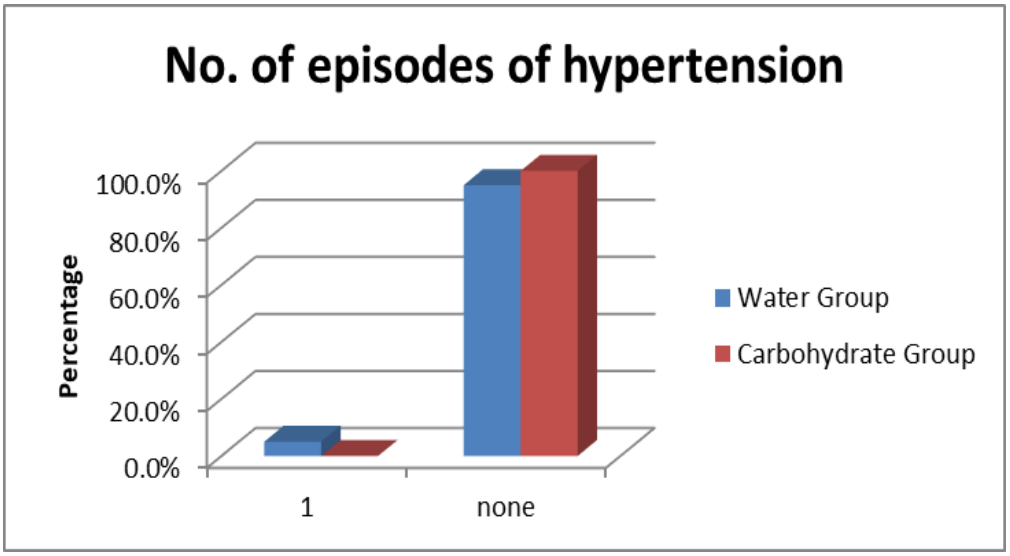


TABLE 11: NUMBER OF EPISODES OF BRADYCARDIA:

		Water Group		Carbohydrate Group		Total	Chi-square value	**p-value**
		Water Group	Water Group	Carbohydrate Group	Carbohydrate Group			
Number of episodes of bradycardia	none	60	100.0%	60	100.0%	120		
Total		60	100.0%	60	100.0%	120		

There were no episodes of bradycardia seen in both the groups.

Table12. Number of episodes of Nausea:

		Water Group		Carbohydrate Group		Total	Chi-square	p-value
		Water Group	Water Group	Carbohydrate Group	Carbohydrate Group			
Number of episodes of Nausea	1	12	20.0%	17	28.3%	29	1.137	0.286
	none	48	80.0%	43	71.7%	91		
Total		60	100.0%	60	100.0%	120		

Number of episodes of nausea were comparable in both the groups.

FIGURE 12: NUMBER OF EPISODE OF NAUSEA

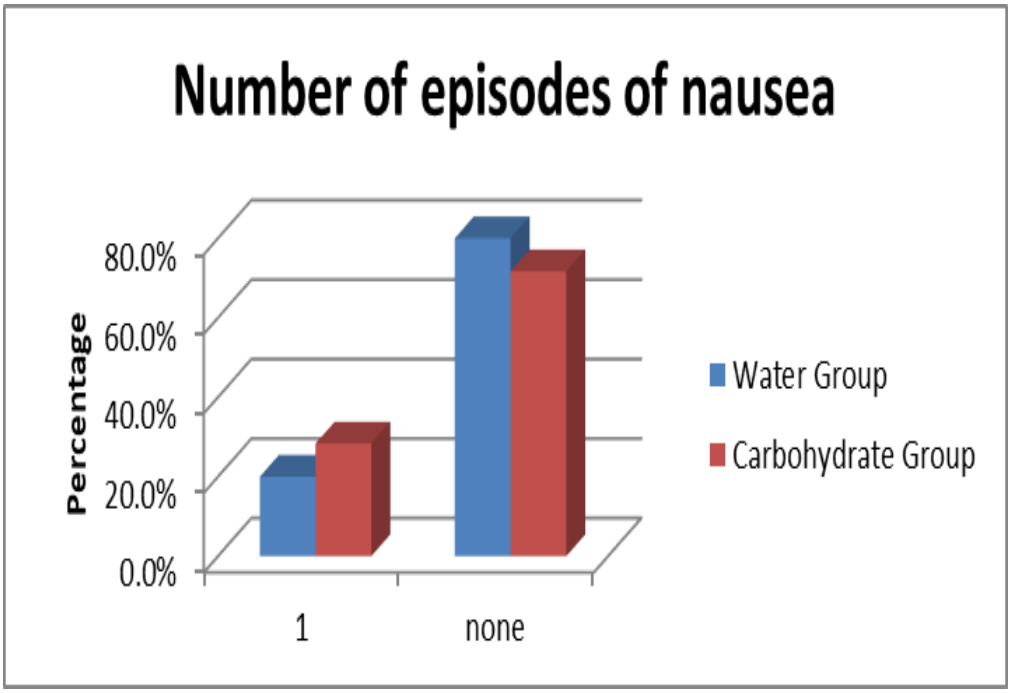


Table 13: NUMBER OF EPISODES OF VOMITING:

		Water Group		Carbohydrate Group		Total	Chi-square value	p-value
		Water Group	Water Group	Carbohydrate Group	Carbohydrate Group			
Number of episodes of vomiting	1	3	5.0%	1	1.7%	4	1.034	0.619
	none	57	95.0%	59	98.3%	116		
Total		60	100.0%	60	100.0%	120		

There was no significant difference in the number of episodes of vomiting.

FIGURE 13: NUMBER OF EPISODES OF VOMITING

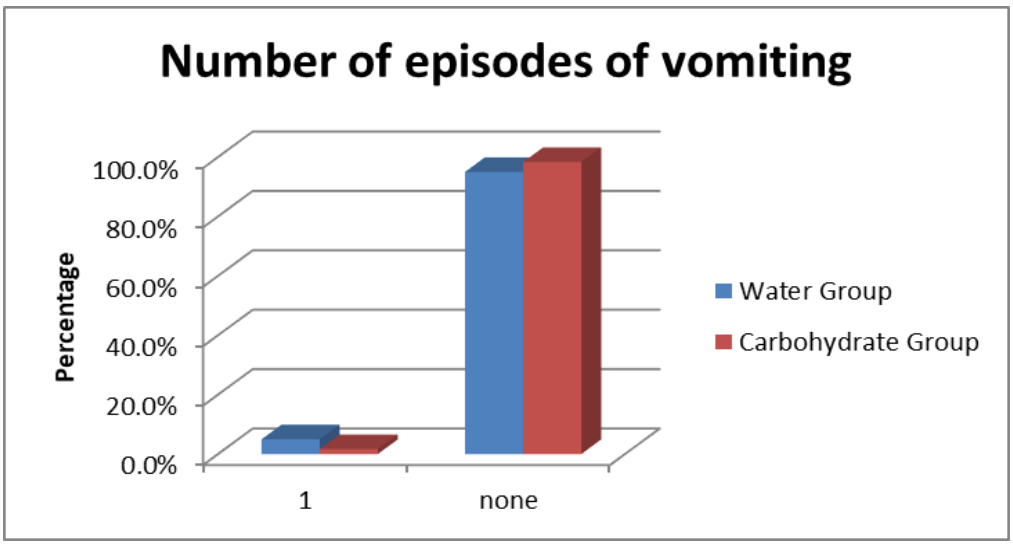


TABLE 14: APGAR SCORE AT 1 MINUTE AND 5 MINUTES.

		Water Group		Carbohydrate Group		Total	Chi-square value	p-value
		Water Group	Water Group	Carbohydrate Group	Carbohydrate Group			
Apgar score at 1 min	6	17	28.3%	21	35.0%	38	2.311	0.510
	7	21	35.0%	24	40.0%	45		
	8	18	30.0%	11	18.3%	29		
	9	4	6.7%	4	6.7%	8		
Total		60	100.0%	60	100.0%	120		
Apgar score at 5 min	7	4	6.7%	4	6.7%	8	0.464	0.927
	8	18	30.0%	16	26.7%	34		
	9	37	61.7%	38	63.3%	75		
	10	1	1.7%	2	3.3%	3		
Total		60	100.0%	60	100.0%	120		

The APGAR scores were comparable for both the groups at 1 minute and 5 minutes interval

FIGURE 14a: APGAR SCORE AT 1 MINUTE

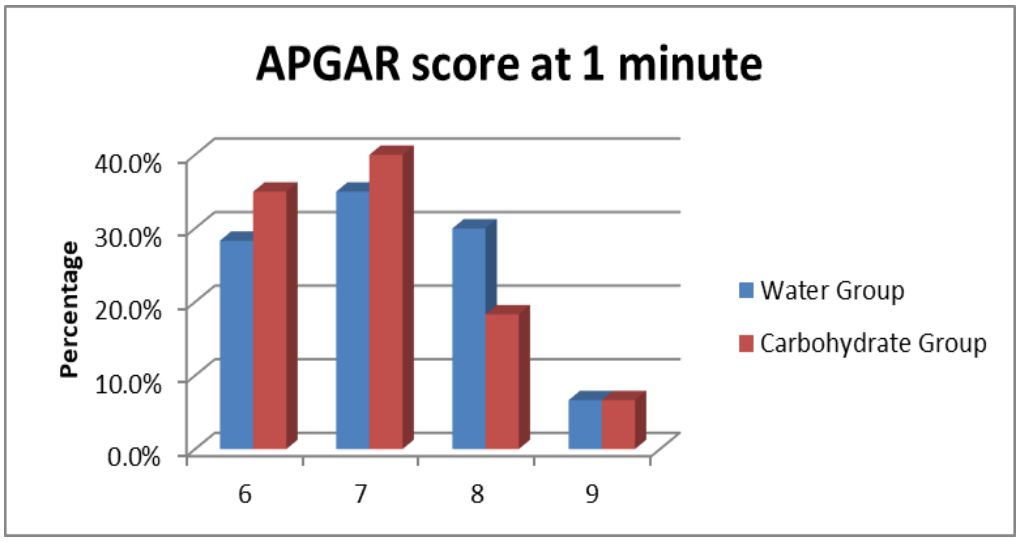


FIGURE 14b: APGAR SCORE AT 5 MINUTE

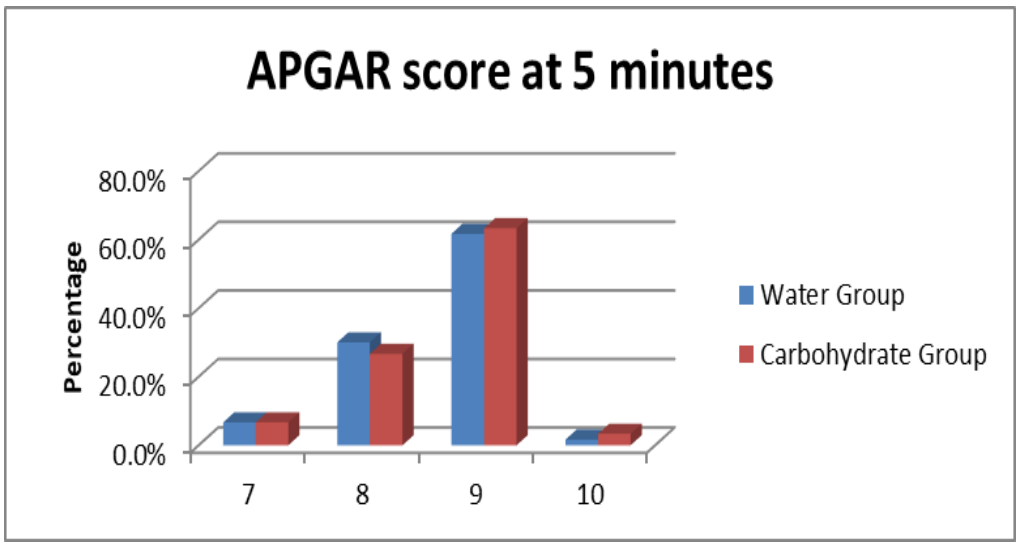


TABLE 15: DOMINANT HAND GRIP STRENGTH POST-OPERATIVELY

	Water Group		Carbohydrate Group		Z	p-value
	Mean	SD	Mean	SD		
Dominant hand grip strength reading 1	27.24	8.22	27.25	9.66	-0.005	0.996
Dominant hand grip strength reading 2	27.29	8.01	27.77	9.38	-0.303	0.762
Dominant and grip strength reading 3	27.60	8.79	27.80	9.25	-0.118	0.906
Dominant hand grip strength mean value	27.35	8.10	27.57	9.29	-0.140	0.889

The dominant hand grip strength was re-measured post-operatively and it showed no statistically significant difference between the two groups.

FIGURE 15: DOMINANT HAND GRIP STRENGHT POST-OPERATIVELY

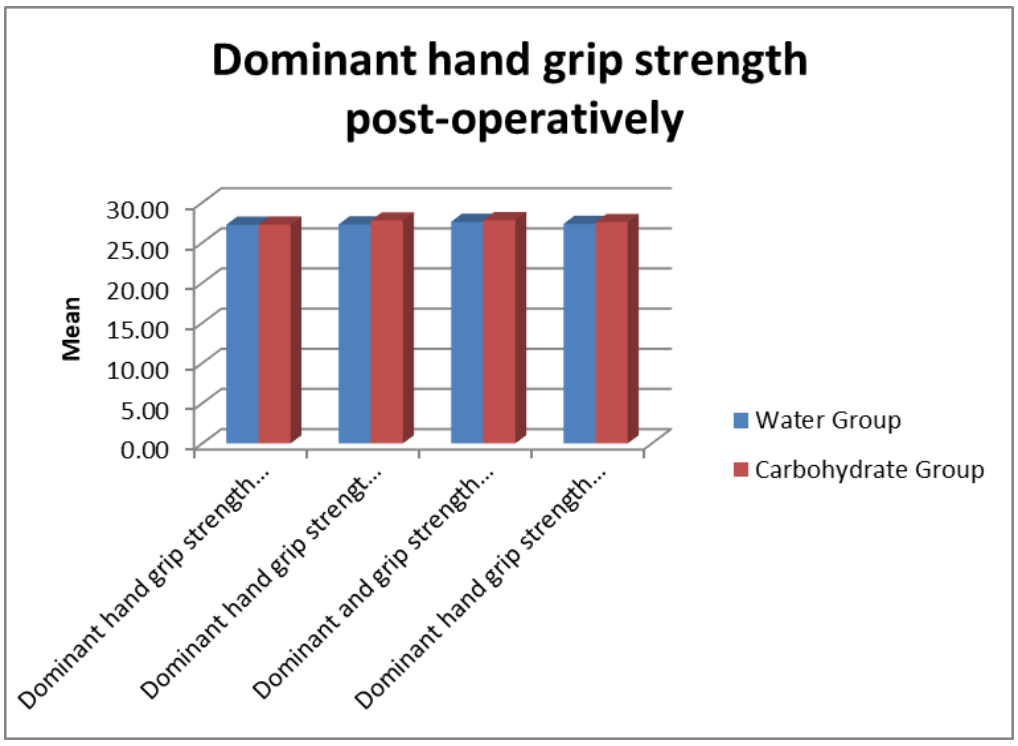
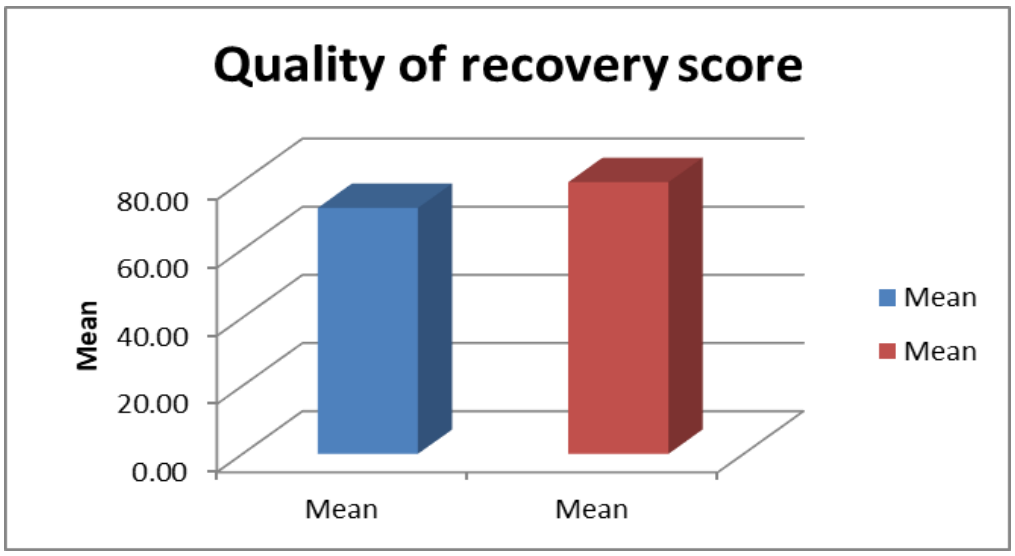


TABLE 16: QUALITY OF RECOVERY SCORE:

	Water Group		Carbohydrate Group		Z	p-value
	Mean	SD	Mean	SD		
Quality of recovery score	72.20	13.60	79.77	13.12	-3.103	0.002

The quality of recovery score in the carbohydrate group was 79.97±13.12 and in the water group was 72.2±13.60. The difference was statistically significant with a p value of 0.002.

FIGURE 16: QUALITY OF RECOVERY SCORE:



DISCUSSION

Oral carbohydrate loading prior to elective surgeries to improve post-operative outcome is one of the most important aspects of the Enhanced Recovery after Surgery (ERAS) pathway.[45-47] ERAS is a multimodal, multidisciplinary initiative to improve perioperative care with the effect of substantial improvements in clinical outcomes and cost.[45]Many recent studies have evaluated the use of preoperative oral drink of simple or other digestible carbohydrates (CHO) on clinical and metabolic results.

These studies have shown that oral CHO loading, facilitates the return of bowel function,[48] preserves skeletal muscle mass [49,25]and decreases postoperative insulin resistance and improves glucose kinetics. [24, 50] Additionally, it has also shown to prevent surgery-induced immunodepression,[51] decrease surgical site infections,[52] improve patients' satisfaction [52] and lower the total number of complications and the length of hospitalisation time.[13]The use of intravenous glucose (10–20% to avoid fluid overload) requires concomitant insulin infusion, access to large veins and frequent monitoring of blood glucose levels by trained staff. These disadvantages can be overcome by using the enteral route which is a more physiological pathway to provide carbohydrate preload.

Thus, recent literature supports oral carbohydrate loading in elective surgeries especially gastro-intestinal surgeries. However, it is important to restrict the oral CHO drink for patients with contraindications, such as known gastroesophageal reflux disease, disorders of gastric motility or diabetes associated with diabetic gastroparesis.[53] However most of these studies have been done on non-parturients. The ERAS society encouraged oral carbohydrate fluid supplementation 2 hours before caesarean delivery to nondiabetic women in the guidelines for antenatal and preoperative care in caesarean delivery in 2018. Nevertheless, the grade of the recommendation was weak due to the low-level evidence [40].

Maternal physiologic adaptations occur during normal pregnancy to ensure an optimum balance between maternal plasma glucose levels and supply of glucose to the developing fetus. In a non-diabetic parturient, third trimester fasting glucose levels are lower relative to the pre-gravid state due to the dilutional effects of the increased maternal circulating blood volume and increased glucose use by the growing feto-placental unit. Despite the relative reduction in fasting glucose levels, maternal insulin sensitivity decreases, hepatic gluconeogenesis increases, and fatty acid levels increase. Postprandial glucose levels are raised relative to pregravid levels because of impaired insulin action due to human placental lactogen and placentally derived human growth hormone (GH-V) and inflammatory mediators, altered pancreatic insulin secretion, and increased hepatic gluconeogenesis [8].

Our study was designed to evaluate the role of preoperative oral carbohydrate (CHO) loading for the prevention of perioperative ketoacidosis as a marker of insulin resistance as well as the quality of recovery in the post-operative period in elective caesarean deliveries. Patients included in this study represented those allowed to drink clear fluids up to two hours before surgery, according to existing guidelines [54,1] that is, patients without risk factors for delayed gastric emptying. In this study, patients with ASA physical status classes II-III were included and were divided into two groups: CHO group and placebo/water group. The demographic characteristics including age, height, weight as well as the ASA physical status were well matched in the two groups. The duration of fasting for solids as well as liquids was also comparable in both the groups.

In this study we measured the urine ketone levels as the primary outcome with the help of reagent strips/dipstick method (Mission urinalysis reagent strips) at the time of catheterization of the bladder immediately prior to surgery. Urinary ketones were measured as absent, 1+, 2+, 3+, or higher. The presence of urinary ketones as the primary outcome was selected because it was a simple non-invasive test of metabolic state of the parturient. Other similar studies assessing

the effectiveness of pre-operative carbohydrate drinks have used a hyper-insulinaemic clamp and the HOMA-IR technique to detect peri-operative insulin resistance, [35, 55-56]. However, these tests add to the expense of the patient as well as cause discomfort because of needle pricks. In the study conducted by Clark et al [11] they also used similar technique (dipstick method) to determine the metabolic state of the parturient. Our study showed 8.3% positive urine ketones in placebo group and 1.7% in CHO group. The results were statistically insignificant. These results were in contrast to those seen by Clark et al [11] who observed significantly high urine ketone levels in the placebo group. They observed that 61% parturients had a positive urinary ketone test in the placebo group compared with 18% of parturients in the CHO group. The lower incidence of urinary ketone levels in the parturients in our study could be attributed to allowance of maintenance intravenous hydration using iso-balanced salt solutions after oral carbohydrate loading or placebo drink. This led to better perfusion with maintenance of hydration and vital paramaters.

The mean RBS at all the times (before drink, immediate pre-operative, immediate post-operative) was similar in both the groups without any significant difference. Even after ingestion of carbohydrate drink, the RBS remained within normal range which can be explained by the accelerated starvation state in the third trimester of pregnancy.

Thirst has been suggested to be the main determinant of preoperative discomfort, followed by anxiety, preoperative insomnia, and hunger. [57]In our study hunger and thirst scores were lower in the CHO group as compared to the placebo group reflecting an improvement in maternal comfort ahead of surgery. This could be supported by the study done by Clark et al[11] who found lower hunger scores in the CHO group as compared to the placebo group. This observation is also supported by study conducted by Wendling et al [7] which suggested that the higher-dose CHO beverage improved hunger while patients who were fasted and patients who consumed the oral rehydration beverage reported more hunger over time. Hunger and thirst scores

along with anxiety, malaise were significantly reduced with CHO preloading as observed by Hausel et al.[13]This was also supported by Yuanying He et al [42] in their preoperative assessment, where pregnant women who had consumed CHO solution were found less thirsty and hungry.

Modified Beck's anxiety scores [43] were significantly higher in the water group as compared to the CHO group. This was in contrast to the study done by Clark et al[11]where the differences in anxiety levels between the study groups did not reach statistical significance. However, the distribution of anxiety scores within each group suggested less anxiety in CHO group compared with the standard care group. The mean baseline heart rate was also found significantly higher in placebo group in our study suggesting CHO drinks could play a beneficial role in ameliorating anxiety levels in parturients.

Hand grip strength has been used as a marker of physical performance indirectly measuring the muscle loss in the peri-operative period due to prolonged NPO regimens. It has been measured in the clinical trials assessing the impact of carbohydrate drinks in the perioperative period. Our study showed no effect of oral carbohydrate loading on the muscle strength of the patient when compared with the placebo group. Comparatively similar results were observed by Clark et al[11] who also did not elucidate any significant difference in the hand grip strength of the two groups. Mathur et al [35]observed that baseline, grip strength was in fact reduced in both the groups on day 0 and over the first week after surgery. The absence of a difference in hand grip strength in our study contradicts the result reported in colorectal surgery by Noblett et al [17] who showed a reduction in grip strength in the fasted and water group as compared the oral CHO group which may be due to the requirement of prolonged fasting periods even in the post-operative phase of the surgery as in gastro-intestinal surgeries. Early resumption of oral intake post-operatively as a part of the ERAS guidelines is particularly suitable of parturients undergoing elective caesarean deliveries and hence, helpful in preserving the muscle mass.

Few studies have also shown that CHO supplementation improves cardiac function in the setting of surgical stress. [58, 59]In our study the hemodynamics of the two groups were well maintained with lesser requirement of vasopressors. This could be due well maintained hydration with intravenous isobalanced salt solutions. This can be supported by Wendling et al [7] in their study where no differences between intravenous fluid resuscitation, MAP or vasopressor support among groups was found. We found no significant difference in terms of adverse anaesthetic outcomes i.e. perioperative episodes of hypotension, hypertension, bradycardia, nausea and vomiting between the groups. These results are in consonance with the results of the study conducted by Yuanying he et al [42] where peri-operative nausea vomiting remained same in the CHO, placebo as well as the fasting group.

The quality of recovery score which includes various aspects of maternal well-being post caesarean delivery was significantly improved in CHO group as compared to the placebo or water group. The quality of recovery score as calculated by the QoR-40 score [60] observed in a study by Wendling et al [7] showed no improvement in the CHO group. This score however, is not specifically tailored for the obstetric population as the one used in our study, ObsQoR-11 score [44]

Limitations of our study include the fact that we did not address the length of hospital stay which is an important outcome of the ERAS guidelines. So, in a follow-up study we can add the length of hospital stay as part of our outcomes. Better and more sensitive biochemical indices could be used to know insulin resistance among fasting parturients such as the HOMA-IR and HOMA 2 index. These can however, add to the expense as well as discomfort to the patient due to their invasive techniques. There may also have been confounders that were not identified in this study such as the nursing staff were not always the same due to change in their shift duty timings. Nonetheless, our results suggest that the preoperative administration of carbohydrate-rich fluids improves overall quality of recovery in

pregnant patients for elective caesarean deliveries and hence can be added safely to the routine protocols for elective uncomplicated caesarean deliveries of ASA II-III parturients..

SUMMARY AND CONCLUSION

The present study was conducted in the department of Anaesthesiology DMC&H Ludhiana after approval by Institutional Ethics Committee on a total of 120 parturients undergoing lower segment caesarean section (LSCS) under subarachnoid block (SAB), who were randomly allocated into two groups of 60 parturients each by computer generated randomized codes contained in sealed, sequentially numbered envelopes. A written informed consent was obtained from each patient.

Group A: Parturients received 400ml of filtered water two hours prior to surgery.

Group B: Parturients were given non particulate carbohydrate drink (0.5 grams per kg of Glucon-D powder containing 99.4% glucose) formulated in 400 ml of filtered water two hours prior to surgery.

The incidence of ketonuria using reagent strips/ dipstick method was studied as primary outcome in both the groups immediately before giving sub-arachnoid block. Secondary outcomes included hunger and thirst scores immediately before entering the operative room, anxiety score on Modified Beck's scale, dominant hand grip strength using electronic dynamometer and Quality of recovery score postoperatively using ObsQoR-11 score. Results obtained were statistically analyzed.

We observed that the difference in the incidence of urinary ketones was not statistically significant in the two groups. The hunger and thirst scores as well as the Modified Beck's anxiety scores were significantly reduced in the CHO group. No difference was seen in the dominant hand grip strength between the two groups. The quality of recovery score was significantly improved in the carbohydrate group. No significant adverse events were noted during the study.

Hence, from our results we may conclude that allowance of clear fluids or CHO drink till two hours before surgery did not seem to have any detrimental effect on the parturient. Rather, carbohydrate loading may

help to reduce the pre-operative indices of patient discomfort including hunger, thirst and anxiety. Quality of recovery with respect to post-operative maternal experience with pain, nausea, vomiting and overall comfort improved with carbohydrate loading. Thus, administration of oral carbohydrate drinks before surgery is safe before elective uncomplicated caesarean deliveries and may have a positive influence on a wide range of perioperative markers of clinical outcome.

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PROFORMA

SR. No. Age:

MRD No.

Height: Weight:

History of drug intake/ allergy:

ASA Grade:

Indication of caesarean section:

General Physical Examination:

Level of consciousness: Build and nutrition:

Pulse rate: SBP: DBP: MAP:

RR: Temperature: Spine:

Investigations:
Haemogram including platelet count:

Any other relevant investigations required:

OBSERVATIONS :

PREOPERATIVE-

Duration of fasting (hours) =

RBS (mg/dl)

Before CHO drink	**Immediate pre-op**	**Immediate postop**

Hunger and thirst score calculation on a numeric rating scale (NRS)

0	**none**	
1-3	**mild**	
4-6	**moderate**	
7-9	**severe**	
10	**uncontrolled**	

Signature of Candidate **Signature of Supervisor**

Dominant hand grip strength in kg:

Reading 1=
Reading 2=
Reading 3=
Mean=

Anxiety score on Modified beck's scale =

Beck Anxiety Inventory

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____ .

- **Urine ketone levels- using reagent strip or dip stick method:**

Negative	
1+	
2+	
3+	

Signature of Candidate **Signature of Supervisor**

INTRAOPERATIVE OBSERVATIONS:

	HR	**SBP**	**DBP**	**MAP**	**SPO2**	**VASOPRESSOR BOLUS**	**FLUIDS GIVEN I/V**
BEFORE ADMINISTRATION OF SAB							
1 MIN							
2 MIN							
3 MIN							
MEAN OF 3 VALUES AS BASELINE							
AFTER ADMINISTRATION OF SAB							
1 MIN							
2 MIN							
3 MIN							
4 MIN							
5 MIN							
6 MIN							
7 MIN							
8 MIN							
UPTO TIME OF DELIVERY OF BABY							
EVERY 5 MIN POST DELIVERY OF BABY							

Signature of Candidate **Signature of Supervisor**

INTRAOPERATIVE EVENTS:

EPISODES OF :	NUMBER	INTERVENTIONS, IF ANY
1. Hypotension		
2. Hypertension		
3. Bradycardia		
4. Nausea		
5. Vomiting		

POST OPERATIVE-

Dominant hand grip strength in kg:

Reading 1=
Reading 2=
Reading 3=
Mean=

Quality of recovery score=

Quality of recovery score following Caesarean delivery (ObsQoR-11)

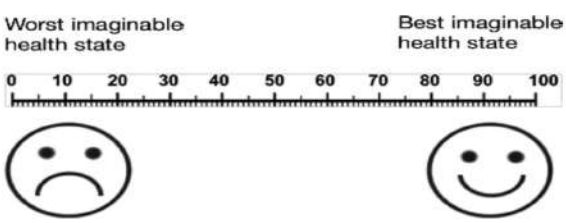
How have you been feeling in the last 24 h?
(0–10, where 0=very poor and 10=excellent)

	Strongly Disagree ⟷ Strongly Agree										
1. I have had moderate pain.	10	9	8	7	6	5	4	3	2	1	0
2. I have had severe pain.	10	9	8	7	6	5	4	3	2	1	0
3. I have had nausea or vomiting.	10	9	8	7	6	5	4	3	2	1	0
4. I have been feeling dizzy.	10	9	8	7	6	5	4	3	2	1	0
5. I have had shivering.	10	9	8	7	6	5	4	3	2	1	0

	Strongly Disagree ⟷ Strongly Agree										
6. I have been comfortable.	0	1	2	3	4	5	6	7	8	9	10
7. I am able to mobilise independently.	0	1	2	3	4	5	6	7	8	9	10
8. I can hold baby without assistance.	0	1	2	3	4	5	6	7	8	9	10
9. I can feed/nurse my baby without assistance.	0	1	2	3	4	5	6	7	8	9	10
10. I can look after my personal hygiene/toilet.	0	1	2	3	4	5	6	7	8	9	10
11. I feel in control.	0	1	2	3	4	5	6	7	8	9	10

Global health score

Please mark with an arrow or a cross on the scale below how you have been feeling in the last 24 h:



Signature of Candidate **Signature of Supervisor**

SR NO.	MRD NO.	group	AGE	HEIGHT CM	WEIGHT KG	History of drug intake or allergy	ASA Grade	Hemoglobin	TLC	Platelet count	Duration of fasting (hours) SOLIDS	Duration of fasting (hours) FLUIDS	RBS before CHO drink	RBS immediate pre-op	RBS immediate post-op	Hunger and thirst score	Dominant hand grip strength reading 1	Dominant hand grip strength reading 2	Dominant hand grip strength reading 3
1	1121826	Water	27	160	75	nkda	III	10.9	4.2	187	10	3.25	124	100	102	8	18.8	20.4	18.6
2	1020634	Water	35	163	75	nkda	II	12.9	10.2	140	14	2	136	124	121	6	16.8	17.2	17.4
3	1031165	Water	36	160	82	nkda	III	10.2	7.8	148	10	2.5	108	98	96	0	20.4	18.6	20.8
4	1038636	Water	28	160	68	nkda	II	12.6	9.5	156	10	2.5	88	90	90	4	22.8	24.2	26.4
5	1042408	Water	34	163	75	nkda	II	10.7	8.6	251	8	3	96	100	92	2	18.6	20.4	20.8
6	870343	Water	25	160	70	nkda	II	11.1	9.8	242	13	2	81	86	84	1	18.2	20.1	16.8
7	218567	Water	29	157	90	nkda	II	9.5	11.9	150	10	3.5	106	110	102	2	24.2	23.6	24.6
8	1059946	Water	26	165	61	nkda	II	14.1	9.9	120	12	3	61	65	70	3	18.2	16.8	18
9	110907	Water	32	153	68	nkda	III	10.2	8.6	187	12	2.5	96	92	90	1	12.8	13.4	14.4
10	207239	Water	42	157	72	nkda	II	11.2	6.7	110	12	2	61	66	68	8	16.2	16.8	14
11	1130924	Water	28	154	60	nkda	II	9.8	6.7	188	12	3	87	84	82	7	14.2	12.8	13
12	208655	Water	34	154	64	nkda	II	11.2	7.2	114	9	2.5	108	104	100	6	15.4	16.8	16.4
13	1132551	Water	30	160	68	nkda	III	10.2	6.4	230	12	2	94	92	88	5	17.8	14.4	19.2
14	1144316	Water	34	157	83	nkda	II	11.9	9.8	168	12	3	98	94	90	2	28.2	32.6	33.4
15	1146408	Water	32	160	72	nkda	II	9.7	9.2	208	14	3	98	100	104	7	17.3	16.8	19.2
16	1146628	Water	29	157	77	nkda	II	10.2	9.2	210	10	2.5	97	102	104	8	27.6	24.5	22.2
17	554005	Water	29	157	81	nkda	II	12.1	9.2	223	15	2	102	109	106	9	25.6	27.2	29.3
18	727880	Water	31	160	70	nkda	II	10.2	6.4	188	8.5	2	94	98	98	10	30.2	29.6	28.2
19	1103044	Water	23	157	68	nkda	II	10.2	9.6	166	10	3	96	88	84	5	18.2	16.5	17.8
20	8307	Water	30	154	75	nkda	II	12.3	7.4	175	9	2	102	107	98	8	23.4	25.6	21.4
21	1154221	Water	33	163	78	nkda	II	10.5	8.2	304	14	3	106	98	94	4	29.6	25.2	22.9
22	1154180	Water	27	160	68	nkda	II	11.2	6.4	146	9	2.5	92	94	93	6	28.8	26.4	22
23	1154940	Water	26	157	72	nkda	II	10.8	8.6	208	11	3	114	108	106	5	22.5	21.8	23.2
24	1007025	Water	27	154	66	nkda	II	10.8	7.2	158	11	2.5	89	92	93	10	24.6	28.2	25.8
25	1155721	Water	35	151	64	nkda	II	12.6	5.4	218	9.5	2	89	90	92	8	28	19.8	26.4
26	1157071	Water	32	154	74	nkda	II	9.9	6.2	214	9	2	96	98	94	9	17.8	15.4	18.3
27	1010109	Water	23	160	68	nkda	II	9.2	11.4	134	10	2	98	94	93	6	28.4	27.6	29.2
28	1135817	Water	29	165	84	nkda	II	9.6	6.4	222	12	3	94	96	97	5	36.2	34.8	38.6
29	970527	Water	30	154	70	nkda	II	9.9	8.2	226	13	3	96	100	102	7	24.2	20.8	26
30	1163493	Water	30	160	76	nkda	II	11.2	7.2	210	11	2	122	126	128	8	28.6	30.4	29.3
31	769398	Water	35	163	69	nkda	II	10.9	7.1	179	11	2	95	98	97	7	24.2	28.6	34.2
32	1164832	Water	30	160	70	Ofloxacin	II	11	4.6	192	12	3	156	168	180	9	36.8	42.4	40.6
33	8155	Water	34	158	68	nkda	II	11.2	8.7	242	12	2.5	78	96	90	2	20.4	18.6	22.1
34	1173707	Water	25	166	71	nkda	II	12.1	5.3	218	13	2	108	113	111	4	33.8	40.2	36
35	1102442	Water	31	157	76	nkda	II	13.8	11.6	164	12	2.5	115	110	102	7	15.5	13.2	17.8
36	1218808	Water	29	163	69	nkda	III	12.2	7.4	156	9	2	94	92	93	8	42.4	39.8	46.4
37	885134	Water	26	157	77	nkda	II	9.6	9.2	210	9	2.5	120	122	118	4	26.6	24.2	23.1
38	882445	Water	33	150	68	nkda	III	10.9	7.8	134	9	2.5	128	130	120	6	19.7	16.2	20.4
39	1230812	Water	20	154	66	nkda	II	10	9.2	190	9	3	96	102	100	8	23.1	22	24.2
40	1129147	Water	31	163	76	nkda	II	12.5	5.5	241	8	2	105	102	104	4	39.2	44	46.2
41	748903	Water	26	168	70.5	nkda	II	9.9	6.8	191	11	2	101	103	104	9	34.8	36.2	35.5
42	1247444	Water	25	157	74	nkda	II	12.2	5.6	195	11	2	111	108	106	6	24.2	20.8	26.4
43	1247411	Water	34	154	66	nkda	II	13.2	3.8	284	9.5	2.5	98	95	94	2	38.6	46.6	45.4
44	1015302	Water	25	163	65	nkda	II	10.2	7.2	192	11	2	98	101	102	10	20.8	24.8	26.2
45	636720	Water	27	160	71	nkda	II	13.2	6.8	214	9	2	96	92	90	3	40.4	42.6	43.8
46	1250735	Water	32	160	76	nkda	II	9.2	6.8	186	9	2.15	88	90	88	2	36.4	32.2	34.8
47	1128831	Water	30	157	69.5	nkda	II	11.1	7.2	185	10	2.5	96	98	99	8	34.6	32.2	34.2
48	1255105	Water	30	157	72.5	nkda	III	10.7	5.8	178	9	2	92	94	94	7	28.2	20.4	26.6
49	1255149	Water	41	166	74	nkda	II	12	4.4	208	9	3	89	92	96	9	32.8	38.6	32.4
50	1209701	Water	29	163	72.5	nkda	II	11.8	9.1	286	11	2	86	82	80	4	26.4	24.2	28.2
51	1161003	Water	26	157	67.5	nkda	II	12.1	4.8	198	9	2	100	96	98	8	38.5	36.4	34.2
52	1164264	Water	38	163	69	nkda	II	9.9	6.1	202	10	2	108	103	102	5	44.2	40.8	46.4
53	1281729	Water	27	166	68	nkda	II	12.8	6.2	194	9	2.5	108	102	99	9	29.5	30.2	34.6
54	1155587	Water	28	160	70	nkda	II	11.9	6.6	191	11	2	101	103	102	6	36.2	38.8	39.2
55	1286929	Water	30	163	68.5	nkda	II	10.9	6.2	189	8	3	96	97	92	2	28.2	30.8	34.2
56	1288291	Water	26	166	75	nkda	II	12.2	6.2	266	10	3	86	85	88	5	32.4	30.6	34.4
57	1287156	Water	25	165	87	nkda	II	9.1	8.2	204	8	2	92	88	90	2	24.4	26.8	22.6
58	1267763	Water	30	164	86	nkda	II	12.4	6.8	220	12	3	112	106	98	5	25.6	24.3	21.4
59	1281153	Water	31	157	73	ofloxacin omidazole	II	10.5	5.6	222	11	3	102	96	98	1	45.6	46.6	44.2
60	1286234	Water	23	158	90	nkda	II	9.4	12.1	250	11	4	114	110	106	6	24.2	23.6	21.8

SR NO.	Mean of dominant hand grip strength (kg)	Modified Beck's anxiety score	Urine ketone levels	HR_before 1min	HR_before 2 min	HR_before 3 min	HR mean of 3 alues as baseline	HR_1MIN	HR_2MIN	HR_3MIN	HR_4MIN	HR_5MIN	HR_6MIN	HR_7MIN	HR_8MIN	HR_9MIN	HR_10MIN	HR_11MIN	HR_12MIN	HR_13MIN	HR_14MIN
1	19.2	23	negative	90	88	96	91	98	90	86	86	88	84	90	-	-	-	-	-	-	-
2	17.1	22	negative	86	90	96	90	94	88	82	80	76	88	86	-	-	-	-	-	-	-
3	19.9	11	negative	88	92	94	92	90	86	84	88	92	94	94	98	100	-	-	-	-	-
4	24.4	18	negative	84	98	106	96	92	88	96	102	98	92	94	-	-	-	-	-	-	-
5	19.9	14	negative	104	106	106	106	110	100	96	98	100	-	-	-	-	-	-	-	-	-
6	18.9	29	negative	116	110	108	112	112	104	96	98	104	110	-	-	-	-	-	-	-	-
7	24.1	12	negative	86	100	104	100	102	100	106	102	102	104	-	-	-	-	-	-	-	-
8	17.6	18	negative	80	76	82	80	74	76	88	86	80	76	76	-	-	-	-	-	-	-
9	13.5	38	negative	104	108	110	108	112	108	100	96	102	104	108	110	-	-	-	-	-	-
10	15.6	24	negative	90	92	94	92	94	92	90	86	88	90	-	-	-	-	-	-	-	-
11	13.3	39	negative	86	90	92	89	92	94	94	96	96	-	-	-	-	-	-	-	-	-
12	16.2	37	1+	92	90	94	92	90	88	84	86	-	-	-	-	-	-	-	-	-	-
13	18.4	22	negative	94	96	95	95	94	90	88	86	92	84	84	-	-	-	-	-	-	-
14	31.4	20	negative	106	108	110	108	105	102	96	94	90	95	98	104	-	-	-	-	-	-
15	17.7	38	negative	110	112	115	112	108	112	114	116	118	115	110	-	-	-	-	-	-	-
16	24.7	35	negative	106	105	109	107	104	96	97	95	98	-	-	-	-	-	-	-	-	-
17	27.3	39	1+	87	92	96	92	98	93	86	84	88	86	87	90	92	94	-	-	-	-
18	29.3	22	negative	98	106	104	103	100	96	92	94	98	100	102	-	-	-	-	-	-	-
19	17.5	30	negative	96	92	98	93	102	99	96	97	92	95	-	-	-	-	-	-	-	-
20	23.4	11	negative	106	98	99	101	104	90	86	84	88	90	-	-	-	-	-	-	-	-
21	25.9	25	negative	78	72	74	75	74	75	76	74	72	70	80	82	84	86	-	-	-	-
22	25.7	13	negative	110	120	122	117	124	122	110	114	108	110	112	-	-	-	-	-	-	-
23	22.5	20	negative	96	102	104	101	100	92	90	94	96	92	99	-	-	-	-	-	-	-
24	26.2	30	negative	108	114	122	114	110	106	94	108	118	120	116	-	-	-	-	-	-	-
25	24.8	28	negative	88	94	98	94	92	94	90	92	96	98	94	99	102	108	-	-	-	-
26	17.1	23	negative	82	78	76	79	84	80	76	74	74	78	76	75	72	80	-	-	-	-
27	28.4	41	negative	111	116	122	116	118	114	108	111	115	110	106	110	-	-	-	-	-	-
28	36.5	14	negative	88	92	98	93	102	96	90	94	96	98	-	-	-	-	-	-	-	-
29	23.6	27	negative	90	94	98	94	96	94	106	108	104	105	102	104	-	-	-	-	-	-
30	29.4	25	negative	92	94	92	92	88	84	86	80	82	85	89	94	96	-	-	-	-	-
31	29	22	negative	96	101	106	101	108	122	120	116	114	118	-	-	-	-	-	-	-	-
32	39.9	38	1+	88	94	90	91	96	90	84	80	82	94	98	-	-	-	-	-	-	-
33	20.3	34	negative	102	104	110	105	106	108	96	92	99	104	-	-	-	-	-	-	-	-
34	36.6	25	negative	86	92	102	93	92	86	88	84	90	98	-	-	-	-	-	-	-	-
35	15.3	17	negative	84	82	86	84	80	82	84	85	88	90	-	-	-	-	-	-	-	-
36	42.8	26	negative	104	111	120	111	114	116	112	104	92	96	98	94	-	-	-	-	-	-
37	24.6	34	negative	112	114	117	114	114	110	108	106	110	108	106	104	111	114	-	-	-	-
38	18.7	35	negative	110	124	120	118	128	116	114	112	116	108	110	-	-	-	-	-	-	-
39	23.1	28	negative	120	124	122	122	120	118	116	115	117	118	120	-	-	-	-	-	-	-
40	43.1	24	negative	88	92	86	89	98	94	96	92	90	92	94	-	-	-	-	-	-	-
41	35.5	27	negative	78	92	94	88	86	88	84	92	96	98	-	-	-	-	-	-	-	-
42	23.8	20	negative	92	94	90	92	90	92	94	90	96	92	96	-	-	-	-	-	-	-
43	43.5	13	negative	84	88	86	86	88	92	108	104	106	-	-	-	-	-	-	-	-	-
44	23.9	29	1+	98	106	104	103	114	110	92	94	96	-	-	-	-	-	-	-	-	-
45	42.2	22	negative	78	82	94	84	90	86	80	82	84	86	-	-	-	-	-	-	-	-
46	34.4	14	negative	104	98	92	98	96	92	94	96	98	102	-	-	-	-	-	-	-	-
47	33.6	18	negative	88	92	98	93	94	98	96	114	112	108	106	-	-	-	-	-	-	-
48	25	34	negative	96	94	106	100	104	112	88	82	76	74	-	-	-	-	-	-	-	-
49	34.6	23	negative	74	88	82	81	88	92	86	84	88	96	-	-	-	-	-	-	-	-
50	26.2	35	1+	88	94	108	96	98	90	94	96	88	96	94	-	-	-	-	-	-	-
51	35.3	26	negative	96	98	98	98	112	108	106	114	108	108	-	-	-	-	-	-	-	-
52	43.8	17	negative	98	96	94	96	92	94	96	98	92	92	96	-	-	-	-	-	-	-
53	31.4	29	negative	106	110	116	111	116	118	120	122	108	104	-	-	-	-	-	-	-	-
54	38	20	negative	108	112	116	112	108	100	104	106	108	-	-	-	-	-	-	-	-	-
55	31	14	negative	88	98	96	94	96	98	112	108	94	96	-	-	-	-	-	-	-	-
56	32.4	30	negative	90	102	106	100	104	102	106	104	100	92	106	-	-	-	-	-	-	-
57	24.6	17	negative	108	110	110	110	112	106	106	107	108	110	108	-	-	-	-	-	-	-
58	23.7	21	negative	98	94	92	95	90	86	84	78	80	82	85	87	94	95	98	98	-	-
59	45.4	15	negative	78	86	88	84	88	90	94	112	108	106	-	-	-	-	-	-	-	-
60	23.2	12	negative	114	118	122	118	120	114	116	118	119	121	-	-	-	-	-	-	-	-

SR NO.	HR_15 min	HR_post 5 min	HR_post 10min	HR_post 15min	HR_post 20 min	HR_post 25 min	HR_post 30 min	HR_post 35 min	HR_post 40 min	HR_post 45 min	HR_post 50 min	HR_post 55min	HR_post 60 min	SBP_before 1 min	SBP_before 2min	SBP_before 3 min	SBP_mean of 3 values	SBP_1min	SBP_2min	SBP_3min	SBP_4min
1	-	90	86	88	84	84	80	82	84	88	90	-	-	150	146	148	148	146	140	136	138
2	-	86	82	76	76	78	74	74	76	72	-	-	-	124	130	130	130	126	110	106	114
3	-	90	92	90	86	84	80	82	80	80	82	-	-	126	124	124	124	120	110	114	118
4	-	90	88	84	82	86	78	72	80	84	80	-	-	118	114	120	117	114	100	92	96
5	-	96	92	90	92	88	80	78	78	76	-	-	-	136	130	130	130	118	130	124	126
6	-	96	84	78	78	80	82	82	84	90	96	-	-	138	136	142	140	124	110	108	98
7	-	96	98	90	86	88	88	86	88	84	82	-	-	154	158	140	150	136	128	132	136
8	-	84	78	70	72	68	70	72	78	-	-	-	-	120	110	128	120	116	108	100	110
9	-	106	108	94	98	96	96	108	-	-	-	-	-	118	124	126	122	104	100	109	114
10	-	86	84	80	78	78	80	82	84	-	-	-	-	130	132	130	130	115	104	100	108
11	-	92	90	80	82	82	84	84	86	-	-	-	-	122	124	118	121	108	110	114	116
12	-	88	90	84	84	82	78	78	86	82	-	-	-	140	150	142	144	140	118	126	128
13	-	90	88	82	76	76	74	80	80	-	-	-	-	124	126	126	126	124	110	106	114
14	-	96	90	82	80	86	78	76	78	80	82	-	-	134	130	136	134	130	126	108	106
15	-	98	94	88	86	86	85	84	88	-	-	-	-	118	114	117	117	118	114	98	100
16	-	82	86	84	80	77	76	74	72	72	-	-	-	116	119	114	116	110	96	94	106
17	-	84	78	76	72	70	80	82	84	86	82	84	-	132	136	128	132	126	128	124	120
18	-	92	90	88	86	84	82	88	86	-	-	-	-	112	116	114	114	110	94	86	98
19	-	94	88	86	78	74	78	76	82	-	-	-	-	146	142	138	142	130	102	93	118
20	-	92	90	86	84	72	76	75	76	74	-	-	-	136	130	126	130	128	120	122	118
21	-	84	76	78	73	75	74	72	71	70	74	-	-	134	130	128	130	122	124	120	128
22	-	108	98	96	90	98	108	104	-	-	-	-	-	118	116	114	116	110	98	106	108
23	-	92	86	84	82	80	76	78	86	90	88	92	96	136	132	128	132	124	117	100	94
24	-	114	110	98	96	99	94	98	92	90	88	-	-	128	124	126	126	120	118	98	94
25	-	92	88	86	84	102	110	108	98	96	-	-	-	126	122	128	126	122	114	110	114
26	-	72	70	68	64	66	68	64	65	70	74	-	-	122	116	124	120	130	120	124	122
27	-	104	98	89	86	88	84	80	82	83	88	-	-	156	148	150	151	144	116	111	123
28	-	90	86	82	78	76	78	74	78	82	-	-	-	130	128	128	128	120	96	104	110
29	-	100	96	92	90	82	84	84	86	-	-	-	-	136	134	134	134	130	112	106	114
30	-	84	80	76	72	70	72	74	80	84	82	86	-	138	134	136	136	124	116	118	122
31	-	116	108	110	104	116	114	106	104	100	-	-	-	134	130	132	130	132	108	110	112
32	-	90	86	84	82	82	80	84	80	82	-	-	-	128	120	124	124	108	96	116	114
33	-	98	86	88	84	82	88	90	94	-	-	-	-	130	136	130	132	120	104	96	110
34	-	96	90	82	80	76	78	78	80	-	-	-	-	130	132	126	130	112	114	118	116
35	-	88	90	86	82	80	78	78	74	-	-	-	-	130	134	136	133	128	105	100	110
36	-	98	100	102	100	96	88	92	94	96	92	-	-	148	144	140	144	136	112	90	96
37	-	106	92	88	90	78	80	76	78	-	-	-	-	118	114	122	118	118	112	108	104
38	-	106	102	104	98	96	97	94	92	92	96	-	-	150	146	144	147	142	120	107	116
39	-	120	118	108	98	90	96	94	95	90	92	-	-	114	116	108	113	110	92	90	96
40	-	84	86	72	78	76	74	78	78	72	-	-	-	128	124	126	126	120	122	106	96
41	-	78	72	74	76	72	70	74	72	70	72	-	-	128	126	124	126	122	120	110	112
42	-	90	84	80	86	82	84	78	86	-	-	-	-	118	114	114	115	116	108	104	106
43	-	104	102	100	99	110	104	96	94	98	-	-	-	116	116	114	116	118	100	98	108
44	-	96	99	106	96	90	92	94	89	-	-	-	-	114	116	114	114	102	94	100	92
45	-	80	78	76	76	74	78	78	76	76	-	-	-	124	126	122	124	110	108	104	108
46	-	78	82	80	86	84	82	80	-	-	-	-	-	132	128	128	128	120	114	112	116
47	-	96	88	82	84	86	80	82	88	-	-	-	-	118	114	114	115	108	106	100	96
48	-	76	72	80	82	74	72	76	74	-	-	-	-	148	142	146	145	124	122	120	120
49	-	90	86	72	74	74	72	76	-	-	-	-	-	144	142	138	141	106	99	112	114
50	-	88	80	92	76	78	80	76	72	-	-	-	-	134	130	126	130	108	92	112	110
51	-	94	88	86	82	82	84	84	86	-	-	-	-	128	126	130	128	120	108	98	102
52	-	96	88	84	76	72	72	74	78	-	-	-	-	146	140	144	143	136	132	128	120
53	-	100	88	82	84	86	86	82	-	-	-	-	-	142	136	132	136	110	100	106	102
54	-	96	92	84	88	86	82	84	86	-	-	-	-	146	144	142	144	140	122	120	118
55	-	92	94	80	82	86	84	82	80	-	-	-	-	128	126	122	125	120	106	94	100
56	-	104	100	90	92	90	94	92	-	-	-	-	-	128	124	126	126	124	98	96	114
57	-	102	98	96	96	94	90	98	94	94	94	96	-	114	116	114	114	112	106	98	102
58	-	90	86	83	84	82	84	82	85	80	-	-	-	126	124	124	124	117	106	102	110
59	-	100	98	106	98	88	90	92	90	-	-	-	-	114	116	116	116	110	92	88	102
60	-	99	99	98	95	88	83	90	-	-	-	-	-	118	110	114	114	99	98	104	108

SR NO.	SBP_5min	SBP_6 min	SBP_7 min	SBP_8 min	SBP_9 min	SBP_ 10 min	SBP_11 min	SBP_ 12 min	SBP_13 min	SBP_14 min	SBP_15 min	SBP_post 5min	SBP_post 10 min	SBP_post 15 min	SBP_post 20 min	SBP_post 25 min	SBP_post 30 min	SBP_post 35 min	SBP_post 40 min
1	130	130	132	-	-	-	-	-	-	-	-	134	140	142	142	144	142	144	144
2	116	122	124	-	-	-	-	-	-	-	-	126	126	124	126	120	124	128	124
3	120	126	128	122	124	-	-	-	-	-	-	128	126	128	126	124	130	130	128
4	106	110	112	-	-	-	-	-	-	-	-	110	114	118	116	112	110	112	114
5	122	-	-	-	-	-	-	-	-	-	-	126	128	124	128	136	126	128	118
6	112	118	-	-	-	-	-	-	-	-	-	124	128	128	132	130	128	116	130
7	136	128	-	-	-	-	-	-	-	-	-	126	128	122	128	132	130	128	130
8	126	120	120	-	-	-	-	-	-	-	-	128	126	126	124	130	126	128	130
9	118	120	124	118	-	-	-	-	-	-	-	114	120	122	124	120	120	122	-
10	110	112	-	-	-	-	-	-	-	-	-	118	124	120	122	122	124	126	126
11	114	-	-	-	-	-	-	-	-	-	-	116	118	120	122	120	116	116	118
12	-	-	-	-	-	-	-	-	-	-	-	120	112	126	128	128	130	134	136
13	118	124	120	-	-	-	-	-	-	-	-	118	116	120	124	126	126	120	120
14	114	120	122	124	-	-	-	-	-	-	-	128	120	125	126	124	126	126	128
15	98	108	106	-	-	-	-	-	-	-	-	110	104	112	116	118	114	112	118
16	108	-	-	-	-	-	-	-	-	-	-	108	112	114	106	98	110	114	116
17	122	124	124	125	-	-	-	-	-	-	-	126	120	122	126	122	124	126	128
18	104	106	112	-	-	-	-	-	-	-	-	114	106	102	104	112	114	118	116
19	128	130	-	-	-	-	-	-	-	-	-	120	108	118	124	126	122	124	126
20	120	124	-	-	-	-	-	-	-	-	-	118	122	124	120	118	116	123	126
21	112	120	124	128	124	120	-	-	-	-	-	122	126	125	128	124	118	116	122
22	110	112	110	-	-	-	-	-	-	-	-	112	114	116	118	112	110	-	-
23	110	114	120	-	-	-	-	-	-	-	-	124	122	122	126	120	118	122	130
24	114	116	116	-	-	-	-	-	-	-	-	114	118	116	120	120	122	122	120
25	116	118	116	118	120	122	-	-	-	-	-	120	124	110	106	110	112	116	112
26	120	124	126	124	126	126	-	-	-	-	-	124	126	124	122	122	130	128	124
27	126	120	106	110	-	-	-	-	-	-	-	116	124	122	115	128	126	130	132
28	106	104	-	-	-	-	-	-	-	-	-	108	116	124	120	122	124	128	124
29	120	122	126	124	-	-	-	-	-	-	-	126	120	118	124	124	126	124	120
30	124	120	122	128	124	-	-	-	-	-	-	126	128	122	130	132	134	130	130
31	106	110	-	-	-	-	-	-	-	-	-	114	118	110	106	118	120	122	126
32	120	124	118	-	-	-	-	-	-	-	-	124	120	120	118	122	124	120	120
33	126	122	-	-	-	-	-	-	-	-	-	110	114	108	128	130	126	120	124
34	120	122	-	-	-	-	-	-	-	-	-	124	122	118	114	118	120	124	124
35	114	122	-	-	-	-	-	-	-	-	-	124	120	118	114	118	122	124	120
36	112	124	122	122	-	-	-	-	-	-	-	120	114	106	100	112	120	124	126
37	110	112	114	120	118	116	-	-	-	-	-	110	114	110	112	114	114	112	112
38	122	118	110	-	-	-	-	-	-	-	-	124	126	126	130	133	129	134	130
39	102	108	110	-	-	-	-	-	-	-	-	110	114	115	116	108	108	110	110
40	94	110	108	-	-	-	-	-	-	-	-	110	120	122	118	112	116	122	124
41	114	116	-	-	-	-	-	-	-	-	-	116	120	120	122	122	120	122	126
42	114	118	108	-	-	-	-	-	-	-	-	110	114	116	118	110	116	114	110
43	102	-	-	-	-	-	-	-	-	-	-	100	102	106	92	98	104	108	112
44	104	-	-	-	-	-	-	-	-	-	-	108	104	98	90	108	102	104	106
45	110	114	-	-	-	-	-	-	-	-	-	112	114	116	112	120	118	116	114
46	114	118	-	-	-	-	-	-	-	-	-	116	112	114	120	118	114	118	-
47	112	110	114	-	-	-	-	-	-	-	-	110	114	118	114	108	106	106	110
48	122	124	-	-	-	-	-	-	-	-	-	120	118	124	126	130	132	132	140
49	110	114	-	-	-	-	-	-	-	-	-	116	120	124	126	122	120	128	-
50	106	100	98	-	-	-	-	-	-	-	-	118	114	120	122	124	118	114	118
51	114	116	-	-	-	-	-	-	-	-	-	116	118	120	122	126	122	120	122
52	122	118	116	-	-	-	-	-	-	-	-	114	110	120	126	124	120	122	128
53	118	124	-	-	-	-	-	-	-	-	-	120	118	116	120	124	126	120	-
54	122	-	-	-	-	-	-	-	-	-	-	126	124	128	130	132	130	134	136
55	108	104	-	-	-	-	-	-	-	-	-	110	112	118	118	114	116	118	120
56	118	102	112	-	-	-	-	-	-	-	-	114	118	120	120	118	114	118	-
57	108	110	110	-	-	-	-	-	-	-	-	112	110	106	108	114	110	112	114
58	116	122	124	124	122	120	118	117	-	-	-	116	120	124	122	124	120	122	120
59	112	106	-	-	-	-	-	-	-	-	-	102	94	98	104	108	104	108	110
60	114	112	108	106	-	-	-	-	-	-	-	110	110	103	105	102	101	101	-

SR NO.	SBP_post 45 min	SBP_post 50 min	SBP_post 55 min	SBP_post 60 min	DBP_before 1 min	DBP_before 2 min	DBP_before 3 min	DBP mean of 3 values	DBP_1 min	DBP_2 min	DBP_3 min	DBP_4 min	DBP_5 min	DBP_6 min	DBP_7 min	DBP_8 min	DBP_9 min	DBP_10 min	DBP_11 min
1	146	146	-	-	100	100	98	99	98	90	90	92	86	80	80	-	-	-	-
2	126	-	-	-	80	82	80	80	78	70	70	72	72	74	74	-	-	-	-
3	120	126	-	-	80	82	80	80	78	76	70	72	74	74	70	78	78	-	-
4	110	116	-	-	72	76	74	74	70	60	58	60	62	64	68	-	-	-	-
5	132	-	-	-	80	72	70	76	80	56	54	56	60	-	-	-	-	-	-
6	134	136	-	-	90	90	94	90	80	74	70	60	62	64	-	-	-	-	-
7	124	-	-	-	96	92	90	94	70	74	70	60	66	68	-	-	-	-	-
8	-	-	-	-	82	76	73	80	68	60	60	66	68	70	70	-	-	-	-
9	-	-	-	-	70	72	70	70	62	60	64	64	66	66	62	66	-	-	-
10	-	-	-	-	90	88	88	88	76	70	68	70	70	68	-	-	-	-	-
11	-	-	-	-	72	70	70	70	70	70	68	68	70	-	-	-	-	-	-
12	136	-	-	-	94	96	96	96	92	72	74	74	-	-	-	-	-	-	-
13	-	-	-	-	80	82	82	82	80	70	66	68	68	68	70	-	-	-	-
14	130	130	-	-	82	84	82	82	80	78	66	64	68	70	74	70	-	-	-
15	-	-	-	-	76	72	70	73	72	66	56	54	56	60	64	-	-	-	-
16	112	-	-	-	78	77	72	76	70	58	60	62	64	-	-	-	-	-	-
17	124	128	126	-	84	82	84	84	78	78	76	76	72	74	74	78	74	72	-
18	-	-	-	-	80	84	82	82	80	78	68	72	72	78	78	-	-	-	-
19	-	-	-	-	98	96	92	95	90	76	68	70	68	66	-	-	-	-	-
20	126	-	-	-	92	90	90	90	86	84	80	82	86	86	-	-	-	-	-
21	124	124	-	-	78	76	78	78	76	74	70	76	68	72	76	72	77	74	-
22	-	-	-	-	80	78	72	77	70	62	66	64	68	66	64	-	-	-	-
23	124	128	124	122	84	86	82	84	78	67	60	56	62	66	66	-	-	-	-
24	120	118	-	-	78	82	80	80	82	80	64	60	64	62	64	-	-	-	-
25	118	-	-	-	84	80	88	84	80	76	70	72	70	72	70	74	72	74	-
26	128	126	-	-	80	78	76	78	76	68	68	70	76	72	76	80	82	84	-
27	130	134	-	-	102	99	98	99	96	74	72	76	76	74	70	70	-	-	-
28	126	-	-	-	84	80	82	82	80	68	68	70	66	64	-	-	-	-	-
29	-	-	-	-	82	80	80	80	78	68	66	68	70	70	68	68	-	-	-
30	132	134	134	-	80	82	80	80	76	72	74	74	76	78	76	72	76	-	-
31	128	-	-	-	82	78	80	80	80	68	66	64	60	62	-	-	-	-	-
32	122	-	-	-	82	80	80	80	62	56	60	62	66	66	64	-	-	-	-
33	-	-	-	-	82	84	80	82	84	70	60	62	68	68	-	-	-	-	-
34	-	-	-	-	88	84	84	85	76	72	74	72	70	70	-	-	-	-	-
35	-	-	-	-	84	80	82	82	80	66	62	66	68	70	-	-	-	-	-
36	128	128	-	-	96	92	88	92	92	76	54	58	58	60	64	62	-	-	-
37	-	-	-	-	76	70	70	72	74	70	68	68	66	66	70	70	70	68	-
38	136	132	-	-	98	96	92	95	92	78	66	70	74	70	66	-	-	-	-
39	110	114	-	-	68	66	68	68	66	52	60	64	64	66	62	-	-	-	-
40	120	-	-	-	88	86	84	86	80	84	72	72	70	72	76	-	-	-	-
41	122	124	-	-	78	74	78	77	74	76	78	74	74	78	-	-	-	-	-
42	-	-	-	-	88	80	82	83	80	76	72	70	72	76	74	-	-	-	-
43	118	-	-	-	72	70	72	72	70	66	64	68	60	-	-	-	-	-	-
44	-	-	-	-	70	68	70	70	60	54	56	50	58	-	-	-	-	-	-
45	-	-	-	-	80	82	80	80	72	76	72	70	72	70	-	-	-	-	-
46	-	-	-	-	86	82	80	83	76	72	70	70	68	68	-	-	-	-	-
47	-	-	-	-	80	78	76	78	72	70	62	60	68	66	66	-	-	-	-
48	-	-	-	-	92	90	98	90	80	82	80	82	78	78	-	-	-	-	-
49	-	-	-	-	86	88	86	86	70	64	70	68	70	72	-	-	-	-	-
50	-	-	-	-	82	80	84	82	70	58	60	60	62	64	60	-	-	-	-
51	-	-	-	-	88	84	88	87	72	68	62	68	68	70	-	-	-	-	-
52	-	-	-	-	92	90	92	92	90	90	84	80	82	78	78	-	-	-	-
53	-	-	-	-	90	88	88	88	76	64	66	62	70	72	-	-	-	-	-
54	-	-	-	-	92	90	92	92	90	84	80	72	74	-	-	-	-	-	-
55	-	-	-	-	82	84	84	84	78	70	62	64	68	68	-	-	-	-	-
56	-	-	-	-	80	78	78	78	70	54	56	62	60	58	58	-	-	-	-
57	108	108	110	-	72	70	74	72	70	62	60	58	58	60	60	-	-	-	-
58	118	-	-	-	80	82	82	82	68	64	60	64	66	66	68	68	66	64	66
59	-	-	-	-	76	78	76	76	70	64	56	58	60	58	-	-	-	-	-
60	-	-	-	-	76	70	72	73	57	57	62	64	60	62	60	58	-	-	-

SR NO.	DBP_12 min	DBP_13 min	DBP_14 min	DBP_15 min	DBP_post 5 min	DBP_post 10 min	DBP_post 15 min	DBP_post 20 min	DBP_post 25 min	DBP_post 30 min	DBP_post 35 min	DBP_post 40 min	DBP_45 min	DBP_50 min	DBP_55 min	DBP_60 min	SpO2_before 1 min	SpO2_before 2 min
1	-	-	-	-	90	92	92	94	94	98	100	99	100	100	-	-	99	98
2	-	-	-	-	70	78	78	76	68	68	72	72	76	-	-	-	97	98
3	-	-	-	-	80	82	84	80	80	82	84	88	84	88	-	-	99	99
4	-	-	-	-	66	64	68	64	62	68	70	70	70	72	-	-	99	99
5	-	-	-	-	60	62	60	64	60	58	56	58	60	-	-	-	100	100
6	-	-	-	-	66	68	70	70	72	70	72	76	76	78	-	-	99	99
7	-	-	-	-	70	66	64	68	70	70	70	62	70	-	-	-	99	99
8	-	-	-	-	80	80	78	74	80	76	76	80	-	-	-	-	99	99
9	-	-	-	-	66	68	68	70	70	72	74	-	-	-	-	-	99	99
10	-	-	-	-	66	70	70	68	70	70	72	72	-	-	-	-	99	99
11	-	-	-	-	72	74	72	72	70	70	68	68	-	-	-	-	99	99
12	-	-	-	-	70	66	70	74	76	76	78	78	76	-	-	-	99	99
13	-	-	-	-	70	68	72	72	76	74	70	72	-	-	-	-	98	98
14	-	-	-	-	72	76	78	80	82	80	82	84	82	80	-	-	98	97
15	-	-	-	-	66	62	68	66	68	68	66	62	-	-	-	-	99	99
16	-	-	-	-	68	66	64	58	58	64	66	66	66	-	-	-	98	98
17	-	-	-	-	70	74	74	70	72	74	72	72	74	72	74	-	99	99
18	-	-	-	-	78	70	64	68	72	76	74	78	-	-	-	-	99	99
19	-	-	-	-	64	62	70	72	74	74	72	74	-	-	-	-	99	99
20	-	-	-	-	88	90	90	92	92	92	90	90	91	-	-	-	99	99
21	-	-	-	-	73	74	70	72	76	78	82	74	80	82	-	-	97	98
22	-	-	-	-	68	64	66	62	64	64	66	-	-	-	-	-	99	99
23	-	-	-	-	62	64	64	65	65	66	68	66	68	68	70	68	98	98
24	-	-	-	-	62	66	64	66	64	66	66	68	64	62	-	-	98	98
25	-	-	-	-	76	72	70	74	74	72	74	74	78	-	-	-	98	98
26	-	-	-	-	82	80	84	86	84	80	78	76	78	78	-	-	97	98
27	-	-	-	-	74	74	70	68	76	78	78	76	78	78	-	-	98	98
28	-	-	-	-	70	70	72	76	68	68	70	70	72	-	-	-	98	98
29	-	-	-	-	68	68	70	72	70	74	68	70	-	-	-	-	98	98
30	-	-	-	-	74	74	78	76	76	74	72	78	76	72	74	-	99	99
31	-	-	-	-	64	66	64	60	64	66	64	64	64	-	-	-	98	98
32	-	-	-	-	66	64	66	62	66	70	70	72	74	-	-	-	99	99
33	-	-	-	-	66	68	66	72	76	70	80	80	-	-	-	-	99	99
34	-	-	-	-	70	68	66	68	68	66	70	68	-	-	-	-	98	98
35	-	-	-	-	72	70	68	62	67	64	68	70	-	-	-	-	99	99
36	-	-	-	-	66	62	60	56	62	66	62	62	66	64	-	-	99	99
37	-	-	-	-	66	68	62	62	64	66	66	65	-	-	-	-	99	99
38	-	-	-	-	68	70	72	72	74	76	72	74	78	80	-	-	98	98
39	-	-	-	-	60	62	65	63	66	68	66	68	68	68	-	-	99	100
40	-	-	-	-	70	72	76	72	74	78	78	76	74	-	-	-	99	99
41	-	-	-	-	74	76	74	74	76	74	74	76	76	76	-	-	98	98
42	-	-	-	-	70	72	72	74	72	74	72	72	-	-	-	-	98	98
43	-	-	-	-	62	60	62	56	58	60	62	62	64	-	-	-	99	99
44	-	-	-	-	56	52	50	50	58	56	56	58	-	-	-	-	99	99
45	-	-	-	-	80	78	78	72	76	72	70	72	70	-	-	-	98	98
46	-	-	-	-	68	70	70	72	70	68	70	-	-	-	-	-	99	99
47	-	-	-	-	66	62	60	66	62	66	62	66	-	-	-	-	99	99
48	-	-	-	-	76	76	78	70	78	84	86	86	-	-	-	-	92	90
49	-	-	-	-	70	72	70	72	74	70	72	-	-	-	-	-	98	98
50	-	-	-	-	68	64	66	64	68	66	68	68	-	-	-	-	98	98
51	-	-	-	-	74	72	76	74	78	78	72	78	-	-	-	-	99	99
52	-	-	-	-	72	70	74	76	74	70	72	78	-	-	-	-	98	98
53	-	-	-	-	70	64	68	68	72	72	74	-	-	-	-	-	98	98
54	-	-	-	-	78	72	78	74	78	82	84	84	-	-	-	-	98	98
55	-	-	-	-	68	70	72	76	72	78	74	76	-	-	-	-	99	99
56	-	-	-	-	56	60	62	64	66	68	66	-	-	-	-	-	98	99
57	-	-	-	-	64	64	62	66	66	70	70	72	70	72	70	-	98	98
58	64	-	-	-	66	64	62	64	66	68	64	66	68	-	-	-	99	99
59	-	-	-	-	56	56	60	62	60	62	68	66	-	-	-	-	99	99
60	-	-	-	-	55	56	57	59	59	59	54	-	-	-	-	-	98	98

SR NO.	SpO2_before 3 min	SpO2_mean of 3 values	SpO2_1 min	SpO2_2 min	SpO2_3 min	SpO2_4 min	SpO2_5 min	SpO2_6 min	SpO2_7 min	SpO2_8 min	SpO2_9 min	SpO2_10 min	SpO2_11 min	SpO2_12 min	SpO2_12 in	SpO2_13 min	SpO2_14 min	SpO2_15 min
1	99	99	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
2	98	98	97	97	98	98	98	98	98	-	-	-	-	-	-	-	-	-
3	99	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-
4	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
5	100	100	99	100	100	100	100	-	-	-	-	-	-	-	-	-	-	-
6	98	99	98	98	99	99	99	99	-	-	-	-	-	-	-	-	-	-
7	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
8	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
9	99	99	99	99	99	100	100	100	100	100	-	-	-	-	-	-	-	-
10	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
11	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
12	99	99	99	99	100	100	-	-	-	-	-	-	-	-	-	-	-	-
13	98	98	98	99	100	100	100	100	100	-	-	-	-	-	-	-	-	-
14	98	98	97	97	98	98	98	98	98	98	-	-	-	-	-	-	-	-
15	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
16	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-	-
17	99	99	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-
18	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
19	99	99	99	98	98	99	99	99	-	-	-	-	-	-	-	-	-	-
20	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
21	98	98	98	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-
22	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
23	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
24	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
25	98	98	98	98	98	100	100	100	100	100	100	100	-	-	-	-	-	-
26	98	98	98	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-
27	98	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-
28	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-
29	98	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-
30	99	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-
31	99	98	98	98	100	100	100	100	-	-	-	-	-	-	-	-	-	-
32	99	99	99	99	99	98	99	99	99	-	-	-	-	-	-	-	-	-
33	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
34	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-
35	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
36	100	100	100	100	100	100	100	100	100	100	-	-	-	-	-	-	-	-
37	99	99	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-
38	98	98	98	98	99	100	100	100	100	-	-	-	-	-	-	-	-	-
39	100	100	99	99	99	100	100	100	100	-	-	-	-	-	-	-	-	-
40	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
41	98	98	99	99	99	95	98	98	-	-	-	-	-	-	-	-	-	-
42	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
43	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
44	99	99	100	100	100	100	100	-	-	-	-	-	-	-	-	-	-	-
45	98	98	99	99	98	98	98	98	-	-	-	-	-	-	-	-	-	-
46	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
47	99	99	99	99	99	98	98	98	98	-	-	-	-	-	-	-	-	-
48	88	90	100	100	100	100	100	100	-	-	-	-	-	-	-	-	-	-
49	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-
50	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
51	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
52	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
53	98	98	98	100	100	100	100	100	-	-	-	-	-	-	-	-	-	-
54	98	98	100	100	100	100	100	-	-	-	-	-	-	-	-	-	-	-
55	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
56	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
57	98	98	98	97	98	100	100	100	100	-	-	-	-	-	-	-	-	-
58	98	99	98	98	99	99	99	99	99	98	99	99	99	99	-	-	-	-
59	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
60	98	98	99	100	100	100	100	100	100	100	-	-	-	-	-	-	-	-

SR NO.	SpO2_post 5 min	SpO2_post 10 min	SpO2_post 15 min	SpO2_post 20 min	SpO2_post 25 min	SpO2_post 30 min	SpO2_post 35 min	SpO2_post 40 min	SpO2_post 45 min	SpO2_post 50 min	SpO2_post 55 min	SpO2_post 60 min	Fluids given	Apgar score at 1 min	Apgar score at 5 min
1	98	96	95	95	95	95	95	98	98	98	-	-	SF1,NS2,NS3,SF4,PL5	7	9
2	98	98	98	97	96	98	98	98	98	-	-	-	PL1,SF2,RL3,NS4,SF6,PL7	6	8
3	99	99	99	99	99	99	99	99	99	99	-	-	NS1,NS2,RL3,NS4,PL5,PL6	8	8
4	99	100	100	100	100	100	100	100	100	100	-	-	NS1,PL2,NS3,RL4	6	9
5	100	100	100	100	100	100	100	100	100	-	-	-	NS1,RL2,NS3,PL4	6	9
6	99	99	97	95	96	96	98	98	98	98	-	-	NS1,PL2,SF3,RL4	7	9
7	98	97	97	97	97	97	97	97	98	98	-	-	PL1,NS2,NS3,NS4	9	9
8	99	99	99	99	99	99	99	99	-	-	-	-	NS1,NS2,NS3,PL4	8	9
9	100	97	97	97	99	99	99	-	-	-	-	-	NS1,RL2,SF3,PL4,NS5,PL6	7	7
10	99	100	100	100	100	100	100	100	-	-	-	-	NS1,SF2,NS3,NS4,SF5	7	9
11	99	97	94	100	100	100	100	100	-	-	-	-	NS1,RL2,PL3,NS4,PL5	7	9
12	100	100	100	100	100	100	100	100	100	-	-	-	PL1,SF2,SF3,NS4,SF5	6	9
13	100	100	100	100	100	100	100	100	-	-	-	-	NS1,PL2,RL3,NS4,PL5,NS6	8	9
14	98	98	98	98	98	98	98	98	98	98	-	-	NS1,NS2,NS3,SF4,NS5	8	8
15	99	99	99	99	99	99	99	99	-	-	-	-	NS1,NS2,NS3,RL4,PL5	9	10
16	98	98	98	98	98	98	98	98	98	-	-	-	NS1,RL2,NS3,RL4,NS5	7	9
17	99	99	99	99	99	99	99	99	99	99	99	-	NS1,RL2,PL3,NS4,NS5	7	8
18	99	99	99	99	99	99	99	99	-	-	-	-	NS1,RL2,SF3,NS4,SF5	6	9
19	99	99	99	99	99	99	99	99	-	-	-	-	NS1,NS2,NS3,RL4	6	7
20	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,NS3,PL4	7	9
21	98	99	99	98	98	99	99	99	99	99	-	-	NS1,RL2,PL3,NS4,PL5	8	9
22	99	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,PL4	8	9
23	98	98	98	98	98	98	98	98	98	98	98	98	NS1,NS2,RL3,NS4,SF5	8	9
24	98	98	96	100	100	100	100	100	100	100	-	-	NS1,PL2,NS3,PL4,RL5	7	8
25	100	100	100	100	100	100	100	100	100	-	-	-	NS1,RL2,RL3,NS4,SF5	7	8
26	97	93	98	100	100	100	100	100	100	100	-	-	PL1,NS2,NS3,RL4	9	9
27	98	98	98	98	98	98	98	98	98	98	-	-	NS1,SF2,NS3,SF4,PL5	6	9
28	98	98	98	98	98	98	98	98	98	-	-	-	RL1,NS2,NS3,PL4	6	8
29	98	100	100	100	100	100	100	99	-	-	-	-	PL1,RL2,NS3,PL4	7	8
30	99	99	99	99	99	99	99	99	99	99	99	-	NS1,PL2,PL3,NS4,NS5	8	9
31	100	100	100	100	100	100	100	100	100	-	-	-	RL1,NS2,NS3,SF4,PL5	7	9
32	99	99	99	99	99	99	99	99	99	-	-	-	NS1,RL2,NS3,PL4,SF5	7	8
33	99	96	99	99	99	99	99	99	-	-	-	-	NS1,RL2,RL3,NS4,SF5	6	9
34	98	98	98	98	98	98	98	98	-	-	-	-	NS1,RL2,NS3,SF4	6	8
35	99	99	99	99	99	99	99	99	-	-	-	-	NS1,NS2,NS3,SF4,PL5	8	9
36	100	100	100	100	100	100	100	100	100	100	-	-	RL1,PL2,NS3,PL4	8	9
37	99	95	94	95	96	96	98	99	-	-	-	-	NS1,RL2,NS3,NS4,PL5	7	9
38	100	100	100	100	100	100	100	100	100	-	-	-	NS1,NS2,NS3,RL4	7	9
39	100	100	100	100	100	100	100	100	100	100	-	-	NS1,NS2,RL3,NS4,SF5	6	8
40	99	99	99	99	99	99	99	99	99	-	-	-	NS1,RL2,NS3,SF4	7	8
41	98	98	98	98	89	99	99	98	98	98	-	-	NS1,RL2,NS3,RL4,SF5	6	9
42	98	98	98	98	98	98	98	98	-	-	-	-	NS1,SF2,NS3,PL4	6	8
43	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,NS3,PL4	7	8
44	100	100	100	100	100	100	100	100	-	-	-	-	NS1,RL2,PL3,NS4,SF5,RL6	8	9
45	98	98	98	98	98	99	99	98	98	-	-	-	NS1,PL2,NS3,SF4	8	8
46	99	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,SF4	6	9
47	98	98	98	98	98	98	98	98	-	-	-	-	NS1,PL2,NS3,PL4	8	9
48	100	100	100	100	100	100	100	100	-	-	-	-	RL1,PL2,NS3,PL4	6	7
49	98	98	98	98	98	98	98	-	-	-	-	-	RL1,PL2,NS3,PL4	7	9
50	98	94	99	99	100	100	100	100	-	-	-	-	RL1,PL2,NS3,PL4	6	7
51	99	99	99	99	99	99	99	99	-	-	-	-	RL1,NS2,NS3,RL4	8	8
52	96	100	100	100	100	100	100	100	-	-	-	-	RL1,PL2,SF3,NS4,SF5	9	9
53	100	100	100	100	100	100	100	-	-	-	-	-	RL1,PL2,NS3,PL4	8	8
54	100	100	100	100	100	100	100	100	-	-	-	-	RL1,PL2,NS3,PL4	6	9
55	99	99	99	99	99	99	99	99	-	-	-	-	NS1,RL2,NS3,RL4	7	9
56	99	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,PL4	7	9
57	100	100	100	100	100	100	100	100	100	100	100	-	RL1,NS2,PL3,NS4,PL5,NS6	8	9
58	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,NS3,NS4,PL5	7	9
59	99	99	99	99	99	99	99	99	-	-	-	-	SF1,PL2,PL3,NS4,RL5	8	8
60	100	100	100	100	100	100	100	-	-	-	-	-	PL1,SF2,PL3,NS4,PL5,SF6	8	9

SR NO.	Number of episodes of hypotension	Intervention for hypotension	Number of episodes of hypertension	Intervention done for hypertension	Number of episodes of bradycardia	Intervention done for bradcardia	Number of episodes of Nausea	Intervention done for nausea	Number of episodes of vomiting	Intervention done for vomiting	Dominant hand grip strength reading 1	Dominant hand grip strengt reading 2	Dominant and grip strength reading 3	Dominant hand grip strength mean value	Quality of recovery score
1	NONE	na	none	na	none	na	none	na	none	na	20.4	18.6	19	19.3	60
2	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	18.2	17.4	17.2	17.6	81
3	NONE	na	none	na	none	na	none	na	none	na	21.4	22.6	22.4	22.1	98
4	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	27.2	27.6	24	26.2	72
5	NONE	na	none	na	none	na	none	na	none	na	26.8	28.2	28	27.6	93
6	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	19.2	22.4	20	20.5	50
7	NONE	na	none	na	none	na	none	na	none	na	22.4	24.6	27.2	24.7	94
8	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	20.4	20	22.6	21	49
9	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	12.8	13.2	14.4	13.3	81
10	3	Ephedrine 6mg	none	na	none	na	none	na	none	na	20.2	18.2	17.4	18.6	87
11	NONE	na	none	na	none	na	none	na	none	na	15.2	13.4	12.6	13.7	59
12	2	phenylephrine 50mcg	none	na	none	na	none	na	none	na	17.4	16.8	16.2	16.8	69
13	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	18.2	19.4	20.6	19.4	66
14	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	30.5	28.2	29.4	29.3	74
15	3	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	18.2	19.4	16.7	18.1	44
16	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	19.8	23.6	24.5	22.6	73
17	NONE	na	none	na	none	na	none	na	none	na	24.2	23.8	25.6	24.5	61
18	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	1	ondansetron 4mg	28.6	20.4	23.2	24	58
19	2	Ephedrine 6mg	1	na	none	na	none	na	none	na	17.8	18.2	18.4	18.1	91
20	NONE	na	none	na	none	na	none	na	none	na	24.5	26.2	26.8	25.8	96
21	NONE	na	none	na	none	na	none	na	none	na	24.4	23.2	21.8	23.1	74
22	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	28.2	26.4	26.8	27.1	73
23	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	19.8	24.2	23.5	22.5	81
24	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	36.2	34.8	37.2	36	64
25	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	28.6	28.2	24	26.9	75
26	NONE	na	none	na	none	na	none	na	none	na	19.3	17.6	21.2	19.3	91
27	3	Ephedrine 6mg	1	na	none	na	none	na	none	na	25.5	27.2	23.4	25.3	78
28	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	38.4	40.2	36.6	38.4	61
29	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	24.2	26.4	26.2	25.6	56
30	NONE	na	none	na	none	na	none	na	none	na	29.1	32.4	28.6	30	93
31	3	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	1	na	30.6	24.4	26.8	27.2	51
32	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	44.2	40.4	42.2	42.2	74
33	2	phenylephrine 50mcg	none	na	none	na	none	na	none	na	24.2	22.8	26.4	24.4	70
34	NONE	na	none	na	none	na	none	na	none	na	32.4	34.6	34.2	33.7	71
35	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	20.2	17.8	24.4	20.8	77
36	2	phenylephrine 50mcg	none	na	none	na	1	ondansetron 4mg	none	na	44.4	42	50.2	45.5	59
37	NONE	na	none	na	none	na	none	na	none	na	18.6	19.4	20.2	19.4	63
38	2	phenylephrine 50mcg	none	na	none	na	1	ondansetron 4mg	none	na	20.5	23.2	19.4	21	60
39	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	19.5	24.2	25.8	23.1	82
40	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	42.2	44.8	47.5	44.8	86
41	NONE	na	none	na	none	na	none	na	none	na	34.2	35.8	40.2	36.7	73
42	NONE	na	none	na	none	na	none	na	none	na	21.6	23.8	24.4	23.2	76
43	3	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	44.2	40.2	36.8	39.4	74
44	3	phenylephrine 50mcg	none	na	none	na	1	ondansetron 4mg	none	na	22.4	24.8	20.6	22.6	65
45	NONE	na	none	na	none	na	none	na	none	na	23.4	24.3	24.8	24.6	68
46	NONE	na	none	na	none	na	none	na	none	na	30.2	33.4	35.6	33.4	86
47	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	32.4	36.6	30.8	33.8	54
48	NONE	na	1	na	none	na	none	na	none	na	34.5	36.6	38.5	36.8	71
49	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	36.8	32.2	36.6	35.2	64
50	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	30.2	28.8	29.4	29.4	52
51	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	28.4	30.8	26.8	28.6	75
52	NONE	na	none	na	none	na	none	na	none	na	36.8	46.2	44	42.3	68
53	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	38.6	32.2	30.8	33.8	71
54	NONE	na	none	na	none	na	none	na	none	na	38	40.2	42.2	40.1	64
55	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	34.2	26.2	20.8	27	81
56	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	39.2	30.8	42.6	37.5	62
57	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	24.8	26.2	28.2	26.4	101
58	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	1	na	23.2	25.4	21.6	23.4	56
59	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	43.4	42.2	45.6	43.7	91
60	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	24.2	24	23.2	23.6	85

SR NO.	MRD NO.	group	AGE	HEIGHT CM	WEIGHT KG	History of drug intake or allergy	ASA Grade	Hemoglobin	TLC	Platelet count	Duration of fasting (hours) SOLIDS	Duration of fasting (hours) FLUIDS	RBS before CHO drink	RBS immediate pre-op	RBS immediate post-op	Hunger and thirst score	Dominant hand grip strength reading 1	Dominant hand grip strength reading 2	Dominant hand grip strength reading 3
1	526465	Carbohydrate	35	154	62	nkda	III	11.7	7.6	148	12	2	85	90	92	4	16.3	17.1	14.1
2	1033575	Carbohydrate	20	165	54	nkda	II	8.3	14.8	210	11	3	83	80	78	3	11.4	10.8	16
3	958946	Carbohydrate	25	163	87	nkda	II	12.5	10.5	185	10	4	80	76	82	5	16.2	14.8	17.4
4	872064	Carbohydrate	25	158	55	nkda	II	11.3	7.5	160	10	2	88	80	72	3	13.2	14.6	14.4
5	972397	Carbohydrate	28	163	68	nkda	II	12.4	8.4	245	11	3.5	96	90	102	4	16.8	18.2	14
6	1111742	Carbohydrate	32	167	76	nkda	II	9.8	8.8	140	10	2	78	76	76	2	16.4	16.2	13.8
7	1103665	Carbohydrate	33	163	80	nkda	II	11.2	7.8	180	12	2	111	110	108	7	18.8	16.2	20.4
8	540077	Carbohydrate	29	163	68	nkda	II	10.2	7.1	216	12	3	109	112	110	4	14.2	13.8	14.6
9	1123817	Carbohydrate	28	165	70	nkda	III	10.9	8.2	95	14	2	89	86	90	2	15.2	16.8	16.6
10	992859	Carbohydrate	30	161	72	nkda	III	11.5	9.3	184	11	4	77	84	82	6	17.8	19.4	19.6
11	585074	Carbohydrate	34	163	68	nkda	II	11.6	10.5	120	9	3	97	94	91	7	14.8	15.6	12.8
12	1125104	Carbohydrate	29	165	67	nkda	II	11.4	6.7	80	9	2.5	77	80	79	2	13.2	14.2	14.4
13	728343	Carbohydrate	29	163	68	nkda	II	12.2	8.4	190	10	3	82	86	85	2	19.2	21.6	20.4
14	1132363	Carbohydrate	25	165	87	nkda	II	9.2	8.4	214	8	2	92	88	90	2	24.4	26.8	22.6
15	1128320	Carbohydrate	31	168	77	nkda	II	11.4	8	214	13	2	93	96	94	8	22.4	20.8	20.6
16	453775	Carbohydrate	28	165	78	nkda	II	10.1	6.8	210	10	2.5	92	94	90	5	20.1	18.2	18.7
17	1062363	Carbohydrate	23	158	90	nkda	II	9.4	12.1	250	11	4	114	110	106	6	24.2	23.6	21.8
18	1142640	Carbohydrate	26	161	87	nkda	II	11.8	6.2	216	13	3.5	112	116	108	8	28.2	25.6	24.2
19	1010632	Carbohydrate	36	164	85	nkda	II	9.8	6.4	215	13	2	96	94	91	2	29.2	27.4	26.7
20	1014109	Carbohydrate	23	158	70	nkda	II	9.8	8.6	214	13	3	98	96	95	3	21.2	19.6	19.5
21	1124685	Carbohydrate	31	157	82	nkda	II	8.9	9.2	210	14	4	106	102	103	2	25.8	26.7	26.2
22	1122206	Carbohydrate	33	154	74	nkda	II	10.8	7.6	192	8	4	110	106	102	1	19.8	21.2	20.4
23	53367	Carbohydrate	30	164	86	nkda	II	12.8	6.2	240	12	3.5	112	106	98	5	25.6	24.3	21.4
24	1152512	Carbohydrate	35	155	75	nkda	II	9.8	7.7	204	16	3	100	108	103	6	22.4	20.8	21.6
25	115475	Carbohydrate	36	157	82	nkda	II	11.4	6.2	265	15	2	150	142	132	3	25.6	27.2	26.4
26	1157860	Carbohydrate	29	161	78	nkda	II	11.8	8.2	190	9	4	94	92	91	2	28.6	30.2	30.4
27	1158397	Carbohydrate	36	160	76	nkda	II	9.4	7.8	176	11	2.5	101	98	98	2	36.8	34.2	38.6
28	1159776	Carbohydrate	38	158	71	nkda	II	11.1	6.8	208	8.5	2	92	90	89	1	38.2	44.2	40.6
29	162604	Carbohydrate	33	154	68	nkda	II	10.4	9.2	214	9	3	88	89	89	5	40.2	43.8	42.6
30	990821	Carbohydrate	32	157	75	nkda	II	12.2	5.8	186	11	3	101	97	95	7	30.2	36.8	34.4
31	1178856	Carbohydrate	33	157	82	nkda	II	10.2	11.7	172	13	2	101	97	92	6	21.2	18.6	24.4
32	1161755	Carbohydrate	29	154	68	nkda	II	10.2	8	140	9	2	110	106	104	2	24.2	20.8	22
33	1191656	Carbohydrate	25	155	73.5	nkda	II	11.2	8.8	214	8	3.5	112	108	107	1	28.8	34.4	30.6
34	1193387	Carbohydrate	32	154	66	nkda	III	10.4	6.8	138	8	3	106	98	96	3	36.8	32.4	34.2
35	1046234	Carbohydrate	37	164	84	nkda	II	11.6	4.5	244	10	2	92	87	88	4	48.2	46.6	48.8
36	1194617	Carbohydrate	28	157	72	nkda	II	12.3	6.4	190	9	3	107	104	100	5	40.2	46.8	50.2
37	1195411	Carbohydrate	19	154	66	nkda	II	9.7	6.4	192	12	3	98	94	92	8	19.2	22.8	26.4
38	1230366	Carbohydrate	32	161	83	nkda	II	11.5	9.2	256	10	2	136	130	128	6	28.2	26.4	25.5
39	1230912	Carbohydrate	26	157	72	nkda	II	11.2	6.9	184	9	3.5	96	92	90	5	39.2	34.6	35.8
40	115661	Carbohydrate	23	154	70	nkda	II	10.9	7.1	189	9	2	92	91	88	4	29.8	32.2	31.4
41	1242739	Carbohydrate	30	164	73	nkda	II	11.1	5.8	291	10.5	2	92	89	88	2	26.2	28.2	30.4
42	1180967	Carbohydrate	31	157	73	ofloxacin omidazole	II	10.8	5.8	212	11	3	102	96	98	1	45.6	46.6	44.2
43	1248219	Carbohydrate	36	160	71	nkda	II	10.5	6.2	244	9	4	103	99	96	2	35	42.2	40.8
44	1248350	Carbohydrate	23	157	66.5	nkda	II	11.2	4.6	235	9.5	2	85	82	84	3	22.4	18.6	24.8
45	1248454	Carbohydrate	35	160	72	nkda	II	11.4	7.2	204	9	3.5	97	96	98	5	35.4	32	36.8
46	1248571	Carbohydrate	33	164	70	nkda	II	12.1	7.2	187	8	3	98	97	96	8	29.4	30.4	32
47	1097891	Carbohydrate	29	160	69	nkda	II	12.1	6.6	256	8	2.3	98	92	90	3	36.5	38.4	40.4
48	1210942	Carbohydrate	41	157	74	nkda	II	10.8	5.4	196	12	2.45	92	91	90	5	38.6	44.2	46.4
49	1173579	Carbohydrate	27	154	65	nkda	II	10.5	5.2	201	9	3.15	98	98	92	2	30.2	34.2	35.6
50	431649	Carbohydrate	30	154	66	nkda	II	9.8	7.6	209	13	2	82	86	85	3	19.2	21.2	22.4
51	1286924	Carbohydrate	35	164	70	nkda	II	12.1	5.4	184	8	3	92	90	89	1	30.6	35.4	34.4
52	194186	Carbohydrate	32	157	68	nkda	II	10.8	6.2	198	10	2	92	90	91	5	44.2	42.8	40
53	1286654	Carbohydrate	29	157	77	nkda	II	10.1	9.6	178	10	2	97	102	104	8	27.6	24.5	22.2
54	1272218	Carbohydrate	32	154	74	nkda	II	9.8	6.1	196	9	2.5	96	98	94	9	17.8	15.4	18.3
55	1248269	Carbohydrate	20	154	66	nkda	II	11	9.3	180	9	3	96	102	100	8	23.1	22	24.2
56	1195124	Carbohydrate	32	160	76	nkda	II	9.6	6.7	183	9	2	88	90	88	2	36.4	32.2	34.8
57	1276251	Carbohydrate	30	160	68	nkda	III	10.9	6.2	218	12	3	94	92	88	5	17.8	14.4	19.2
58	1226251	Carbohydrate	26	157	67.5	nkda	II	11.4	4.5	192	9	2	100	96	98	8	38.5	36.4	34.2
59	1285542	Carbohydrate	32	153	68	nkda	III	10.6	8.5	183	12	2.5	96	92	90	1	12.8	13.4	14.4
60	1286232	Carbohydrate	35	151	64	nkda	II	12.1	5.4	218	9.5	2	88	89	91	8	28	19.8	26.4

SR NO.	Mean of dominant hand grip strength (kg)	Modified Beck's anxiety score	Urine ketone levels	HR_before 1min	HR_before 2 min	HR_before 3 min	HR mean of 3 alues as baseline	HR_1MIN	HR_2MIN	HR_3MIN	HR_4MIN	HR_5MIN	HR_6MIN	HR_7MIN	HR_8MIN	HR_9MIN	HR_10MIN	HR_11MIN	HR_12MIN	HR_13MIN	HR_14MIN
1	15.8	19	negative	96	94	94	94	90	90	88	88	90	-	-	-	-	-	-	-	-	-
2	12.7	11	negative	104	100	98	101	110	100	100	104	102	100	100	-	-	-	-	-	-	-
3	16.1	16	negative	96	98	100	98	104	102	100	102	96	96	94	94	92	-	-	-	-	-
4	14	11	negative	90	94	92	92	104	100	96	96	94	94	88	88	-	-	-	-	-	-
5	16.3	26	negative	106	112	108	109	104	98	96	100	102	110	-	-	-	-	-	-	-	-
6	15.4	14	negative	76	72	80	76	88	84	82	76	72	-	-	-	-	-	-	-	-	-
7	18.5	26	1+	92	98	100	-	104	100	96	90	84	84	82	-	-	-	-	-	-	-
8	14.2	31	negative	110	104	108	106	108	110	104	100	98	98	-	-	-	-	-	-	-	-
9	14.8	35	negative	80	82	86	82	90	84	88	90	90	92	96	96	94	96	-	-	-	-
10	18.9	15	negative	90	94	88	91	86	82	80	76	74	-	-	-	-	-	-	-	-	-
11	14.4	29	negative	96	90	92	92	94	86	88	84	78	77	76	82	86	-	-	-	-	-
12	13.9	37	negative	118	122	124	121	120	116	114	108	110	114	-	-	-	-	-	-	-	-
13	20.4	9	negative	82	78	78	79	78	74	72	70	70	76	84	-	-	-	-	-	-	-
14	24.6	17	negative	108	110	110	110	112	106	106	107	108	110	108	-	-	-	-	-	-	-
15	21.2	10	negative	84	90	92	87	90	86	80	78	80	84	84	-	-	-	-	-	-	-
16	19	25	negative	94	100	102	98	104	100	96	98	99	98	-	-	-	-	-	-	-	-
17	23.2	12	negative	114	118	122	118	120	114	116	118	119	121	-	-	-	-	-	-	-	-
18	26	9	negative	78	82	84	81	88	82	78	76	74	73	70	78	-	-	-	-	-	-
19	27.7	18	negative	84	90	92	89	90	84	86	85	83	82	80	94	-	-	-	-	-	-
20	20.1	14	negative	98	90	92	93	96	90	88	86	92	94	98	-	-	-	-	-	-	-
21	26.2	26	negative	84	82	78	82	82	80	76	72	74	-	-	-	-	-	-	-	-	-
22	20.4	20	negative	82	80	80	80	86	78	74	90	92	88	84	-	-	-	-	-	-	-
23	23.7	21	negative	98	94	92	95	90	86	84	78	80	82	85	87	94	95	98	98	-	-
24	21.6	17	negative	110	106	112	109	110	108	112	115	117	-	-	-	-	-	-	-	-	-
25	26.4	8	negative	88	86	80	84	78	76	80	82	82	78	76	74	82	84	-	-	-	-
26	29.7	15	negative	86	88	90	88	84	86	92	96	98	94	-	-	-	-	-	-	-	-
27	36.5	12	negative	96	94	96	96	92	90	86	84	88	86	-	-	-	-	-	-	-	-
28	41	14	negative	84	82	88	84	86	82	84	80	82	86	-	-	-	-	-	-	-	-
29	42.2	19	negative	96	102	104	101	108	100	92	98	104	102	92	90	-	-	-	-	-	-
30	33.8	25	negative	110	108	114	110	114	112	122	116	118	120	110	-	-	-	-	-	-	-
31	21.4	17	negative	116	124	120	120	120	112	92	90	86	84	90	92	91	94	100	102	-	-
32	22.3	19	negative	90	103	104	97	106	102	100	96	94	98	99	-	-	-	-	-	-	-
33	31.2	6	negative	78	84	82	81	78	80	82	74	76	80	-	-	-	-	-	-	-	-
34	34.4	21	negative	92	94	102	96	94	90	86	88	90	95	96	-	-	-	-	-	-	-
35	47.8	8	negative	96	90	94	94	90	84	90	100	-	-	-	-	-	-	-	-	-	-
36	45.7	15	negative	80	84	92	85	84	82	78	86	92	-	-	-	-	-	-	-	-	-
37	22.8	18	negative	98	110	108	105	100	102	114	116	110	114	-	-	-	-	-	-	-	-
38	26.7	17	negative	92	103	110	107	104	110	98	92	90	94	96	92	95	94	96	100	-	-
39	36.5	16	negative	92	96	100	96	98	96	99	108	106	108	-	-	-	-	-	-	-	-
40	31.1	23	negative	94	88	96	93	92	90	114	108	116	114	-	-	-	-	-	-	-	-
41	28.2	18	negative	76	82	84	81	90	84	82	80	84	86	88	80	82	-	-	-	-	-
42	45.4	15	negative	78	86	88	84	88	90	94	112	108	106	-	-	-	-	-	-	-	-
43	39.3	15	negative	78	74	82	78	76	78	80	74	78	88	-	-	-	-	-	-	-	-
44	21.9	24	negative	98	96	98	98	90	112	110	106	114	-	-	-	-	-	-	-	-	-
45	34.7	17	negative	78	92	96	89	90	92	90	86	84	86	-	-	-	-	-	-	-	-
46	30.6	27	negative	96	108	104	102	104	98	106	104	98	96	-	-	-	-	-	-	-	-
47	38.4	15	negative	80	76	90	83	80	76	74	72	78	84	88	-	-	-	-	-	-	-
48	43	26	negative	88	82	84	85	82	80	76	72	74	70	70	76	-	-	-	-	-	-
49	33.3	15	negative	88	84	86	86	84	82	80	78	76	-	-	-	-	-	-	-	-	-
50	20.9	26	negative	108	112	120	117	106	98	99	104	100	102	-	-	-	-	-	-	-	-
51	33.4	19	negative	92	86	88	88	82	88	92	106	104	-	-	-	-	-	-	-	-	-
52	42.3	12	negative	96	98	98	98	94	90	92	92	90	94	-	-	-	-	-	-	-	-
53	24.7	35	negative	106	105	109	107	104	96	97	95	98	-	-	-	-	-	-	-	-	-
54	17.1	23	negative	82	78	76	79	84	80	76	74	74	78	76	75	72	80	-	-	-	-
55	23.1	28	negative	120	124	122	122	120	118	116	115	117	118	120	-	-	-	-	-	-	-
56	34.4	14	negative	104	98	92	98	96	92	94	96	98	102	-	-	-	-	-	-	-	-
57	18.4	22	negative	94	96	95	95	94	90	88	86	92	84	84	-	-	-	-	-	-	-
58	35.3	26	negative	96	98	98	98	112	108	106	114	108	108	-	-	-	-	-	-	-	-
59	13.5	38	negative	104	108	110	108	112	108	100	96	102	104	108	110	-	-	-	-	-	-
60	26.2	28	negative	88	94	98	94	92	94	90	92	96	98	94	88	100	108	-	-	-	-

SR NO.	HR_15 min	HR_post 5 min	HR_post 10min	HR_post 15min	HR_post 20 min	HR_post 25 min	HR_post 30 min	HR_post 35 min	HR_post 40 min	HR_post 45 min	HR_post 50 min	HR_post 55min	HR_post 60 min	SBP_before 1 min	SBP_before 2min	SBP_before 3 min	SBP_mean of 3 values	SBP_1min	SBP_2min	SBP_3min	SBP_4min
1	-	97	94	96	100	74	84	90	88	88	76	70	-	118	116	118	118	116	110	110	112
2	-	72	74	72	70	72	72	76	80	-	-	-	-	118	112	110	115	120	114	108	108
3	-	110	104	100	96	94	90	90	90	-	-	-	-	116	120	120	119	118	110	110	108
4	-	92	96	94	92	94	94	90	-	-	-	-	-	120	116	118	118	110	110	112	118
5	-	96	96	98	90	84	82	82	-	-	-	-	-	128	134	130	130	128	100	104	116
6	-	86	82	70	72	76	78	70	74	74	-	-	-	120	116	122	119	118	108	110	110
7	-	90	96	80	72	70	78	80	82	-	-	-	-	130	134	134	-	130	110	104	108
8	-	98	96	96	90	90	88	94	98	-	-	-	-	120	124	124	123	110	100	126	120
9	-	84	76	71	74	83	77	74	78	-	-	-	-	132	130	130	130	120	100	98	102
10	-	78	84	86	70	72	74	72	80	80	-	-	-	124	122	124	124	110	106	108	120
11	-	88	92	82	76	78	74	80	84	-	-	-	-	136	132	130	132	128	116	114	122
12	-	118	102	106	110	104	100	98	96	100	-	-	-	112	116	108	112	98	90	104	112
13	-	80	74	70	68	66	68	70	72	-	-	-	-	120	116	118	118	106	110	114	116
14	-	102	98	96	96	94	90	98	94	94	94	96	-	114	116	114	114	112	106	98	102
15	-	80	72	76	77	72	70	80	82	84	-	-	-	128	126	124	126	120	106	110	118
16	-	92	88	86	84	84	82	86	86	84	-	-	-	130	128	130	130	126	114	108	116
17	-	99	99	98	95	88	83	90	-	-	-	-	-	118	110	114	114	99	98	104	108
18	-	76	72	74	73	74	76	71	70	72	71	-	-	118	124	120	121	118	116	118	112
19	-	84	80	76	74	72	74	68	70	74	72	72	74	128	120	124	124	116	104	110	116
20	-	90	84	86	80	78	76	82	84	-	-	-	-	110	112	116	112	110	96	92	98
21	-	76	70	78	76	74	74	72	76	74	80	-	-	128	124	124	126	120	108	112	116
22	-	83	78	72	70	70	74	75	76	74	-	-	-	118	112	116	115	108	92	96	103
23	-	90	86	83	84	82	84	82	85	80	-	-	-	126	124	124	124	117	106	102	110
24	-	116	109	100	104	97	92	88	86	90	98	-	-	136	140	128	134	130	106	90	112
25	-	78	76	72	72	74	76	74	72	74	74	-	-	30	122	126	126	128	120	116	114
26	-	90	92	86	84	82	78	76	74	78	-	-	-	124	120	128	124	110	102	108	104
27	-	90	84	80	82	86	84	80	78	76	84	-	-	148	142	140	143	128	120	120	116
28	-	82	80	76	82	84	70	74	72	76	-	-	-	138	134	138	137	130	120	122	120
29	-	82	84	80	82	84	80	82	82	86	88	-	-	136	132	134	134	122	118	102	98
30	-	104	98	96	114	110	108	102	98	90	-	-	-	122	124	124	124	120	102	100	108
31	-	86	84	82	82	80	86	88	84	85	-	-	-	136	138	140	138	120	100	114	128
32	-	98	84	80	86	84	78	74	76	78	74	-	-	116	118	114	116	104	92	90	96
33	-	76	72	68	70	68	72	74	70	-	-	-	-	120	116	188	188	116	110	112	108
34	-	90	82	80	84	86	82	84	84	-	-	-	-	144	146	138	143	136	114	108	118
35	-	90	84	78	76	76	74	78	80	84	-	-	-	124	120	126	124	118	102	100	110
36	-	80	76	72	68	70	74	76	72	74	72	-	-	126	124	126	126	124	112	118	110
37	-	108	100	94	92	96	92	94	94	92	-	-	-	118	116	120	120	118	96	98	108
38	-	90	84	80	76	75	74	68	66	76	-	-	-	132	136	134	134	130	114	102	106
39	-	96	92	86	82	80	76	74	78	76	-	-	-	128	126	124	126	122	108	100	104
40	-	96	98	92	96	94	96	92	92	-	-	-	-	116	112	118	115	110	88	96	98
41	-	80	82	86	84	82	80	80	82	-	-	-	-	136	134	130	134	130	110	112	108
42	-	100	98	106	98	88	90	92	90	-	-	-	-	114	116	116	116	110	92	88	102
43	-	70	72	74	72	76	74	72	70	72	72	-	-	118	124	120	121	110	108	112	114
44	-	112	110	90	92	94	96	90	-	-	-	-	-	114	118	120	117	100	90	110	92
45	-	82	84	80	80	76	74	76	76	78	-	-	-	120	124	124	124	120	124	116	114
46	-	94	88	86	84	84	86	88	88	-	-	-	-	138	142	144	142	144	108	106	114
47	-	86	90	92	94	96	90	88	86	-	-	-	-	118	114	116	116	114	110	108	110
48	-	70	68	68	72	74	70	70	72	74	-	-	-	134	130	132	132	128	120	122	118
49	-	80	74	72	70	68	74	72	-	-	-	-	-	124	126	122	124	118	116	120	122
50	-	98	96	94	94	92	90	96	-	-	-	-	-	112	114	110	112	98	92	86	98
51	-	100	92	90	80	86	82	84	-	-	-	-	-	130	126	128	128	124	114	104	108
52	-	88	86	80	78	78	80	82	84	-	-	-	-	124	122	126	124	112	110	108	114
53	-	82	86	84	80	77	76	74	72	72	-	-	-	116	119	114	116	110	96	94	106
54	-	72	70	68	64	66	68	64	65	70	74	-	-	122	116	124	120	130	120	124	122
55	-	120	118	108	98	90	96	94	95	90	92	-	-	114	116	108	113	110	92	90	96
56	-	78	82	80	86	84	82	80	-	-	-	-	-	132	128	128	128	120	114	112	116
57	-	90	88	82	76	76	74	80	80	-	-	-	-	124	126	126	126	124	110	106	114
58	-	94	88	86	82	82	84	84	86	-	-	-	-	128	126	130	128	120	108	98	102
59	-	106	108	94	98	96	96	108	-	-	-	-	-	118	124	126	122	104	100	109	114
60	-	92	88	86	84	102	110	106	99	96	-	-	-	126	122	128	126	122	114	110	114

SR NO.	SBP_5min	SBP_6 min	SBP_7 min	SBP_8 min	SBP_9 min	SBP_ 10 min	SBP_11 min	SBP_ 12 min	SBP_13 min	SBP_14 min	SBP_15 min	SBP_post 5min	SBP_post 10 min	SBP_post 15 min	SBP_post 20 min	SBP_post 25 min	SBP_post 30 min	SBP_post 35 min	SBP_post 40 min
1	116	-	-	-	-	-	-	-	-	-	-	98	106	100	118	120	108	106	104
2	110	108	112	-	-	-	-	-	-	-	-	100	122	110	112	114	112	108	110
3	108	104	104	104	110	-	-	-	-	-	-	112	110	106	108	108	112	116	116
4	120	122	122	120	-	-	-	-	-	-	-	116	114	118	122	126	124	126	-
5	130	128	-	-	-	-	-	-	-	-	-	130	132	134	142	130	132	132	-
6	114	-	-	-	-	-	-	-	-	-	-	114	118	120	122	126	120	120	122
7	124	122	120	-	-	-	-	-	-	-	-	120	118	118	122	126	130	130	126
8	124	116	-	-	-	-	-	-	-	-	-	110	104	118	118	120	126	120	120
9	104	110	112	126	124	124	-	-	-	-	-	130	124	119	124	117	116	115	110
10	124	-	-	-	-	-	-	-	-	-	-	116	108	102	116	118	120	122	124
11	126	128	124	122	124	-	-	-	-	-	-	126	128	126	128	132	132	136	134
12	114	108	-	-	-	-	-	-	-	-	-	110	112	114	114	112	108	110	110
13	116	118	117	-	-	-	-	-	-	-	-	112	118	120	116	120	122	122	120
14	108	110	110	-	-	-	-	-	-	-	-	112	110	106	108	114	110	112	114
15	122	124	124	-	-	-	-	-	-	-	-	124	126	120	122	124	120	118	120
16	124	120	-	-	-	-	-	-	-	-	-	116	112	118	124	126	120	124	126
17	114	112	108	106	-	-	-	-	-	-	-	110	110	103	105	102	101	101	-
18	110	114	112	118	-	-	-	-	-	-	-	110	114	118	108	112	114	116	112
19	114	118	124	122	-	-	-	-	-	-	-	120	123	124	126	120	118	114	120
20	104	106	108	-	-	-	-	-	-	-	-	106	110	112	112	114	110	108	110
21	116	-	-	-	-	-	-	-	-	-	-	120	122	124	120	118	118	116	122
22	107	111	114	-	-	-	-	-	-	-	-	112	116	114	118	114	110	114	110
23	116	122	124	124	122	120	118	117	-	-	-	116	120	124	122	124	120	122	120
24	108	-	-	-	-	-	-	-	-	-	-	126	122	120	118	124	126	122	118
25	118	122	120	124	124	120	-	-	-	-	-	122	118	119	124	122	124	120	124
26	106	110	-	-	-	-	-	-	-	-	-	118	120	122	126	124	124	120	118
27	118	118	-	-	-	-	-	-	-	-	-	122	124	122	128	124	122	126	124
28	118	114	-	-	-	-	-	-	-	-	-	110	112	120	122	124	128	126	128
29	106	110	112	120	-	-	-	-	-	-	-	118	116	120	124	128	126	124	122
30	110	114	118	-	-	-	-	-	-	-	-	112	106	100	110	112	114	116	118
31	130	134	132	135	140	142	138	132	-	-	-	138	140	140	134	140	134	146	140
32	104	112	110	-	-	-	-	-	-	-	-	108	104	106	100	102	108	106	110
33	110	112	-	-	-	-	-	-	-	-	-	108	106	110	112	114	114	116	116
34	120	126	116	-	-	-	-	-	-	-	-	106	124	126	122	124	126	130	130
35	114	-	-	-	-	-	-	-	-	-	-	118	120	122	124	120	118	114	118
36	118	-	-	-	-	-	-	-	-	-	-	108	112	114	118	120	124	122	124
37	110	112	-	-	-	-	-	-	-	-	-	110	112	114	110	116	116	118	112
38	112	112	108	110	118	120	124	122	-	-	-	120	114	108	112	120	128	132	134
39	122	120	-	-	-	-	-	-	-	-	-	120	122	120	124	124	122	130	128
40	116	114	-	-	-	-	-	-	-	-	-	116	114	120	112	110	112	118	112
41	114	118	120	122	122	-	-	-	-	-	-	128	126	120	122	124	120	124	120
42	112	106	-	-	-	-	-	-	-	-	-	102	94	98	104	108	104	108	110
43	116	112	-	-	-	-	-	-	-	-	-	110	114	120	118	118	114	116	120
44	96	-	-	-	-	-	-	-	-	-	-	104	106	106	108	110	112	112	-
45	118	116	-	-	-	-	-	-	-	-	-	110	112	114	116	116	118	118	114
46	116	114	-	-	-	-	-	-	-	-	-	116	114	118	114	116	120	124	126
47	112	118	114	-	-	-	-	-	-	-	-	116	120	110	108	108	106	108	110
48	116	118	120	122	-	-	-	-	-	-	-	120	120	122	124	122	120	122	120
49	124	-	-	-	-	-	-	-	-	-	-	120	122	124	120	120	122	118	-
50	104	106	-	-	-	-	-	-	-	-	-	104	96	90	92	96	92	90	-
51	112	-	-	-	-	-	-	-	-	-	-	110	116	114	116	120	124	128	-
52	116	120	-	-	-	-	-	-	-	-	-	122	120	118	118	118	120	124	126
53	108	-	-	-	-	-	-	-	-	-	-	108	112	114	106	98	110	114	116
54	120	124	126	124	126	126	-	-	-	-	-	124	126	124	122	122	130	128	124
55	102	108	110	-	-	-	-	-	-	-	-	110	114	115	116	108	108	110	110
56	114	118	-	-	-	-	-	-	-	-	-	116	112	114	120	118	114	118	-
57	118	124	120	-	-	-	-	-	-	-	-	118	116	120	124	126	126	120	120
58	114	116	-	-	-	-	-	-	-	-	-	116	118	120	122	126	122	120	122
59	118	120	124	118	-	-	-	-	-	-	-	114	120	122	124	120	120	122	-
60	116	118	116	118	120	122	-	-	-	-	-	120	124	110	106	110	112	116	112

SR NO.	SBP_post 45 min	SBP_post 50 min	SBP_post 55 min	SBP_post 60 min	DBP_before 1 min	DBP_before 2 min	DBP_before 3 min	DBP mean of 3 values	DBP_1 min	DBP_2 min	DBP_3 min	DBP_4 min	DBP_5 min	DBP_6 min	DBP_7 min	DBP_8 min	DBP_9 min	DBP_10 min	DBP_11 min
1	104	114	118	-	74	70	66	70	58	70	64	68	72	-	-	-	-	-	-
2	-	-	-	-	68	60	62	64	64	66	58	60	62	60	64	-	-	-	-
3	-	-	-	-	80	82	80	80	76	74	70	70	72	68	68	68	72	-	-
4	-	-	-	-	80	80	82	80	76	78	78	78	84	84	84	82	-	-	-
5	-	-	-	-	88	82	90	87	86	66	68	70	80	82	-	-	-	-	-
6	122	-	-	-	70	70	76	72	70	70	72	68	68	-	-	-	-	-	-
7	-	-	-	-	80	80	78	-	76	70	60	64	70	70	72	-	-	-	-
8	-	-	-	-	80	80	82	82	76	70	80	76	70	70	-	-	-	-	-
9	-	-	-	-	88	88	90	88	82	70	66	68	66	70	68	70	72	76	-
10	124	-	-	-	70	72	72	72	66	60	62	66	68	-	-	-	-	-	-
11	-	-	-	-	84	80	80	81	82	76	70	74	74	76	70	70	72	-	-
12	116	-	-	-	68	66	68	68	60	56	58	60	62	62	-	-	-	-	-
13	-	-	-	-	76	74	74	74	62	64	66	60	62	64	64	-	-	-	-
14	108	108	110	-	72	70	74	72	70	62	60	58	58	60	60	-	-	-	-
15	122	-	-	-	84	80	82	82	78	70	72	72	74	74	70	-	-	-	-
16	126	-	-	-	80	80	82	80	76	66	62	66	70	70	-	-	-	-	-
17	-	-	-	-	76	70	72	73	57	57	62	64	60	62	60	58	-	-	-
18	-	-	-	-	76	74	78	76	74	76	72	70	72	68	74	76	-	-	-
19	124	126	122	124	92	84	80	86	88	77	81	81	82	85	88	89	-	-	-
20	-	-	-	-	74	74	72	74	70	64	56	58	59	62	64	-	-	-	-
21	122	124	-	-	78	76	76	76	72	70	74	72	74	-	-	-	-	-	-
22	112	-	-	-	76	72	78	76	68	54	56	58	58	60	60	-	-	-	-
23	118	-	-	-	80	82	82	82	68	64	60	64	66	66	68	68	66	64	66
24	124	126	-	-	90	88	86	88	84	70	60	66	68	-	-	-	-	-	-
25	120	124	-	-	86	84	84	84	82	80	78	78	77	74	76	72	74	78	-
26	116	-	-	-	86	84	84	84	70	62	68	66	64	66	-	-	-	-	-
27	126	122	-	-	88	86	86	84	86	80	74	72	70	74	76	-	-	-	-
28	130	-	-	-	86	84	88	86	80	72	74	72	76	70	-	-	-	-	-
29	128	126	-	-	88	84	84	85	80	82	70	66	62	68	64	66	-	-	-
30	120	-	-	-	78	80	78	76	66	60	64	66	66	68	-	-	-	-	-
31	144	-	-	-	88	90	90	90	60	50	74	76	80	82	86	85	84	86	86
32	114	112	-	-	70	70	68	70	66	58	56	58	58	60	58	-	-	-	-
33	-	-	-	-	72	70	70	70	68	66	64	66	62	62	-	-	-	-	-
34	-	-	-	-	92	94	92	92	90	76	70	72	70	74	70	-	-	-	-
35	112	-	-	-	78	76	78	78	70	64	62	64	60	-	-	-	-	-	-
36	122	-	-	-	80	82	84	82	80	76	70	72	72	-	-	-	-	-	-
37	118	-	-	-	84	80	82	82	78	54	52	56	58	58	-	-	-	-	-
38	130	-	-	-	90	92	92	92	86	82	70	70	70	68	62	60	66	64	68
39	122	-	-	-	78	82	81	81	72	64	62	66	66	64	-	-	-	-	-
40	-	-	-	-	70	68	68	68	62	52	54	54	58	52	-	-	-	-	-
41	-	-	-	-	84	80	80	80	84	76	74	72	76	74	74	76	78	-	-
42	-	-	-	-	76	78	76	76	70	64	56	58	60	58	-	-	-	-	-
43	122	120	-	-	72	76	74	74	68	66	64	68	68	64	-	-	-	-	-
44	-	-	-	-	76	72	72	73	66	60	62	54	56	-	-	-	-	-	-
45	116	-	-	-	78	76	78	78	70	72	70	68	68	70	-	-	-	-	-
46	-	-	-	-	90	92	92	92	94	80	72	70	68	62	-	-	-	-	-
47	-	-	-	-	72	70	70	70	66	64	66	66	64	66	66	-	-	-	-
48	120	-	-	-	80	82	82	88	86	80	80	80	76	74	74	74	-	-	-
49	-	-	-	-	82	84	86	84	72	74	70	74	76	-	-	-	-	-	-
50	-	-	-	-	72	70	70	70	66	62	54	58	60	62	-	-	-	-	-
51	-	-	-	-	84	82	80	82	80	70	62	64	66	-	-	-	-	-	-
52	-	-	-	-	86	80	84	84	78	76	76	78	76	78	-	-	-	-	-
53	112	-	-	-	78	77	72	76	70	58	60	62	64	-	-	-	-	-	-
54	128	126	-	-	80	78	76	78	76	68	68	70	76	72	76	80	82	84	-
55	110	114	-	-	68	66	68	68	66	52	60	64	64	66	62	-	-	-	-
56	-	-	-	-	86	82	80	83	76	72	70	70	68	68	-	-	-	-	-
57	-	-	-	-	80	82	82	82	80	70	66	68	68	68	70	-	-	-	-
58	-	-	-	-	88	84	88	87	72	68	62	68	68	70	-	-	-	-	-
59	-	-	-	-	70	72	70	70	62	60	64	64	66	66	62	66	-	-	-
60	118	-	-	-	84	80	88	84	80	76	70	72	70	72	70	74	72	74	-

SR NO.	DBP_12 min	DBP_13 min	DBP_14 min	DBP_15 min	DBP_post 5 min	DBP_post 10 min	DBP_post 15 min	DBP_post 20 min	DBP_post 25 min	DBP_post 30 min	DBP_post 35 min	DBP_post 40 min	DBP_45 min	DBP_50 min	DBP_55 min	DBP_60 min	SpO2_before 1 min	SpO2_before 2 min
1	-	-	-	-	52	46	60	80	70	68	54	54	64	60	70	-	99	99
2	-	-	-	-	60	72	62	60	66	60	60	60	-	-	-	-	100	100
3	-	-	-	-	72	70	70	72	72	74	74	76	-	-	-	-	98	99
4	-	-	-	-	78	76	78	80	82	82	84	-	-	-	-	-	98	99
5	-	-	-	-	80	84	82	82	78	80	80	-	-	-	-	-	99	99
6	-	-	-	-	70	72	70	70	74	68	68	72	74	-	-	-	98	99
7	-	-	-	-	70	66	68	70	70	74	74	78	-	-	-	-	98	98
8	-	-	-	-	70	64	66	68	74	74	70	70	-	-	-	-	99	100
9	-	-	-	-	66	60	62	58	61	53	64	66	-	-	-	-	9	99
10	-	-	-	-	66	60	58	66	68	68	70	70	72	-	-	-	97	97
11	-	-	-	-	70	74	78	80	82	80	82	82	-	-	-	-	99	99
12	-	-	-	-	64	64	68	68	66	66	64	68	68	-	-	-	99	100
13	-	-	-	-	64	68	68	66	66	66	68	70	-	-	-	-	98	98
14	-	-	-	-	64	64	62	66	66	70	70	72	70	72	70	-	98	98
15	-	-	-	-	70	72	74	74	72	72	74	76	76	-	-	-	99	99
16	-	-	-	-	70	66	68	66	68	68	70	72	72	-	-	-	99	99
17	-	-	-	-	55	56	57	59	59	59	54	-	-	-	-	-	98	98
18	-	-	-	-	78	76	72	70	74	76	70	72	72	74	-	-	99	99
19	-	-	-	-	76	74	72	74	76	76	78	78	76	74	75	78	99	99
20	-	-	-	-	68	66	64	66	68	68	68	72	-	-	-	-	99	99
21	-	-	-	-	78	80	80	82	84	80	82	84	80	82	-	-	99	98
22	-	-	-	-	62	60	62	64	62	60	64	66	66	-	-	-	99	99
23	64	-	-	-	66	64	62	64	66	68	64	66	68	-	-	-	99	99
24	-	-	-	-	68	66	70	72	76	74	74	70	72	74	-	-	98	98
25	-	-	-	-	76	78	80	80	82	85	84	82	80	80	-	-	99	99
26	-	-	-	-	68	64	68	78	78	72	70	72	86	-	-	-	99	99
27	-	-	-	-	76	78	84	86	88	88	84	80	86	84	-	-	98	98
28	-	-	-	-	74	72	74	76	74	78	76	78	78	-	-	-	99	99
29	-	-	-	-	66	68	64	66	68	68	70	72	72	74	-	-	98	99
30	-	-	-	-	66	62	60	64	64	66	62	66	66	-	-	-	99	99
31	84	-	-	-	88	86	80	85	78	86	84	88	84	-	-	-	98	98
32	-	-	-	-	56	56	58	60	60	62	58	60	60	62	-	-	99	99
33	-	-	-	-	60	62	64	64	62	66	62	62	-	-	-	-	99	99
34	-	-	-	-	68	66	68	70	70	72	74	70	-	-	-	-	98	98
35	-	-	-	-	62	64	66	64	66	62	64	68	66	-	-	-	99	99
36	-	-	-	-	68	70	72	72	70	70	68	72	74	74	-	-	99	99
37	-	-	-	-	56	58	58	58	60	62	60	60	62	-	-	-	99	100
38	68	-	-	-	66	66	64	66	68	66	68	68	70	-	-	-	98	98
39	-	-	-	-	68	68	70	72	76	72	70	72	76	-	-	-	98	98
40	-	-	-	-	60	62	64	62	60	60	64	66	-	-	-	-	99	99
41	-	-	-	-	78	74	72	74	76	76	72	78	-	-	-	-	99	99
42	-	-	-	-	56	56	60	62	60	62	68	66	-	-	-	-	99	99
43	-	-	-	-	66	68	66	68	66	64	68	62	64	66	-	-	98	98
44	-	-	-	-	60	62	60	64	64	66	68	-	-	-	-	-	99	99
45	-	-	-	-	70	68	72	72	70	72	76	72	70	-	-	-	99	99
46	-	-	-	-	70	72	78	78	78	80	88	88	-	-	-	-	98	99
47	-	-	-	-	68	66	66	66	62	66	64	66	-	-	-	-	99	98
48	-	-	-	-	76	74	74	76	74	70	70	72	72	-	-	-	98	98
49	-	-	-	-	72	78	78	80	82	84	84	-	-	-	-	-	98	99
50	-	-	-	-	60	56	54	56	54	50	58	-	-	-	-	-	99	99
51	-	-	-	-	62	68	68	62	60	64	62	-	-	-	-	-	98	99
52	-	-	-	-	80	84	86	88	82	86	86	88	-	-	-	-	99	99
53	-	-	-	-	68	66	64	58	58	64	66	66	66	-	-	-	98	98
54	-	-	-	-	82	80	84	86	84	80	78	76	78	78	-	-	97	98
55	-	-	-	-	60	62	65	63	66	68	66	68	68	68	-	-	99	100
56	-	-	-	-	68	70	70	72	70	68	70	-	-	-	-	-	99	99
57	-	-	-	-	70	68	72	72	76	74	70	72	-	-	-	-	98	98
58	-	-	-	-	74	72	76	74	78	78	72	78	-	-	-	-	99	99
59	-	-	-	-	66	68	68	70	70	72	74	-	-	-	-	-	99	99
60	-	-	-	-	76	72	70	74	74	72	74	74	78	-	-	-	98	98

SR NO.	SpO2_before 3 min	SpO2_mean of 3 values	SpO2_1 min	SpO2_2 min	SpO2_3 min	SpO2_4 min	SpO2_5 min	SpO2_6 min	SpO2_7 min	SpO2_8 min	SpO2_9 min	SpO2_10 min	SpO2_11 min	SpO2_12 min	SpO2_12 in	SpO2_13 min	SpO2_14 min	SpO2_15 min
1	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
2	100	100	98	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
3	99	99	98	99	99	99	99	99	98	98	98	-	-	-	-	-	-	-
4	99	-	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-
5	98	99	98	98	99	99	99	99	-	-	-	-	-	-	-	-	-	-
6	99	99	99	98	98	98	98	-	-	-	-	-	-	-	-	-	-	-
7	98	98	98	99	99	99	99	99	98	-	-	-	-	-	-	-	-	-
8	99	99	99	99	99	98	98	99	-	-	-	-	-	-	-	-	-	-
9	99	99	98	98	98	98	98	98	98	98	98	99	-	-	-	-	-	-
10	97	97	97	98	98	98	98	-	-	-	-	-	-	-	-	-	-	-
11	99	99	98	98	99	100	100	100	99	99	99	-	-	-	-	-	-	-
12	100	100	100	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
13	99	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
14	98	98	98	97	98	100	100	100	100	-	-	-	-	-	-	-	-	-
15	99	99	98	98	99	99	99	99	99	-	-	-	-	-	-	-	-	-
16	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
17	98	98	99	100	100	100	100	100	100	100	-	-	-	-	-	-	-	-
18	99	99	98	98	99	99	99	99	99	99	-	-	-	-	-	-	-	-
19	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-
20	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-
21	98	98	98	99	99	100	100	-	-	-	-	-	-	-	-	-	-	-
22	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
23	98	99	98	98	99	99	99	99	99	98	99	99	99	99	-	-	-	-
24	99	98	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
25	99	99	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-
26	98	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
27	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-
28	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
29	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-
30	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
31	98	98	97	97	98	98	98	98	98	98	98	98	98	98	98	-	-	-
32	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-
33	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
34	98	98	98	98	98	99	100	100	100	-	-	-	-	-	-	-	-	-
35	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
36	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
37	100	100	100	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
38	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	-	-	-
39	98	98	98	99	100	100	100	100	-	-	-	-	-	-	-	-	-	-
40	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
41	99	99	99	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-
42	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
43	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
44	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
45	99	99	98	98	99	99	99	99	-	-	-	-	-	-	-	-	-	-
46	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
47	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-
48	98	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-
49	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
50	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
51	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-	-
52	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
53	98	98	98	98	98	98	98	-	-	-	-	-	-	-	-	-	-	-
54	98	98	98	98	98	98	98	98	98	98	98	98	-	-	-	-	-	-
55	100	100	99	99	99	100	100	100	100	-	-	-	-	-	-	-	-	-
56	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
57	98	98	98	99	100	100	100	100	100	-	-	-	-	-	-	-	-	-
58	99	99	99	99	99	99	99	99	-	-	-	-	-	-	-	-	-	-
59	99	99	99	99	99	100	100	100	100	100	-	-	-	-	-	-	-	-
60	98	98	98	98	98	100	100	100	100	100	100	100	-	-	-	-	-	-

SR NO.	SpO2_post 5 min	SpO2_post 10 min	SpO2_post 15 min	SpO2_post 20 min	SpO2_post 25 min	SpO2_post 30 min	SpO2_post 35 min	SpO2_post 40 min	SpO2_post 45 min	SpO2_post 50 min	SpO2_post 55 min	SpO2_post 60 min	Fluids given	Apgar score at 1 min	Apgar score at 5 min
1	99	8	99	100	100	100	100	100	100	100	100	-	NS1,RL2,NS3,PL4	7	8
2	98	98	99	99	99	99	99	99	-	-	-	-	NS1,RL2,SF3,NS4,RL5	7	9
3	99	98	98	99	99	99	99	99	-	-	-	-	NS1,SF2,NS3,NS4	8	8
4	98	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,PL4	6	9
5	99	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,PL4	6	9
6	98	98	97	95	96	96	96	97	98	-	-	-	PL1,SF2,NS3,SF4,PL5,NS6	8	8
7	98	96	94	94	95	97	97	98	-	-	-	-	NS1,RL2,NS3,SF4,SF5	6	9
8	99	99	99	99	99	99	99	99	-	-	-	-	NS1,RL2,NS3,NS4,PL5,SF6	8	9
9	98	98	98	98	99	99	99	99	-	-	-	-	PL1,SF2,SF3,NS4,PL5	7	8
10	98	97	95	96	98	99	99	99	99	-	-	-	NS1,RL2,NS3,NS4,PL5,PL6	6	7
11	99	98	98	98	98	98	98	98	-	-	-	-	SF1,PL2,PL3,NS4,SF5	9	10
12	99	99	99	99	99	99	99	99	99	-	-	-	NS1,RL2,NS3,PL4,PL5	6	8
13	98	99	100	100	99	99	99	99	-	-	-	-	PL1,SF2,SF3,NS4,PL5,PL6	6	9
14	100	100	100	100	100	100	100	100	100	100	100	-	RL1,NS2,PL3,NS4,PL5,NS6	7	9
15	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,RL2,PL5,NS6	7	8
16	99	99	99	99	99	99	99	99	99	-	-	-	PL1,RL2,PL3,NS4,RL5,SF6	7	9
17	100	100	100	100	100	100	100	-	-	-	-	-	PL1,SF2,PL3,NS4,PL5,SF6	7	9
18	99	99	96	94	99	99	99	99	99	99	-	-	NS1,RL2,NS3,SF4,SF5	8	9
19	99	98	94	99	99	99	100	100	100	100	100	100	NS1,SF2,NS3,PL4	9	9
20	99	99	99	99	99	99	99	99	-	-	-	-	NS1,NS2,NS3,SF4	6	7
21	100	100	100	100	100	100	100	100	100	100	-	-	NS1,RL2,NS3,PL4,PL5,NS6	6	8
22	99	99	99	99	99	99	99	99	99	-	-	-	NS1,SF2,NS3,SF4	7	7
23	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,NS3,NS4,PL5	7	9
24	99	98	96	98	100	100	100	100	100	100	-	-	NS1,RL2,NS3,NS4,PL5,PL6	6	9
25	99	96	97	97	99	99	99	99	99	99	-	-	NS1,PL2,PL3,NS4,SF5	7	9
26	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,NS3,PL4	8	9
27	98	98	98	98	98	98	98	98	98	98	-	-	PL1,SF2,NS3,SF4	6	8
28	99	99	99	99	99	99	99	99	99	-	-	-	PL1,RL2,NS3,PL4	6	9
29	99	94	100	100	100	100	100	100	100	100	-	-	NS1,RL2,NS3,RL4,PL5	7	9
30	99	94	100	100	100	100	100	100	100	-	-	-	RL1,PL2,NS3,PL4	7	9
31	98	98	98	98	98	98	98	98	98	98	-	-	NS1,RL2,SF3,NS4	7	9
32	99	99	99	99	99	99	99	99	99	99	-	-	NS1,RL2,NS3,RL4	6	9
33	99	99	99	99	99	99	99	99	-	-	-	-	RL1,NS2,NS3,RL4	7	8
34	100	100	100	100	100	100	100	100	-	-	-	-	NS1,RL2,NS3,PL4	8	8
35	99	99	99	99	99	99	99	99	99	-	-	-	RL1,NS2,NS3,RL4	8	9
36	99	99	99	99	99	99	99	99	99	99	-	-	RL1,NS2,NS3,SF4	6	9
37	99	99	99	99	99	99	99	99	99	-	-	-	NS1,PL2,NS3,RL4	7	8
38	98	98	98	98	98	98	98	98	98	-	-	-	PL1,NS2,RL3,NS4,SF5	6	8
39	100	100	100	100	100	100	100	100	100	-	-	-	NS1,SF2,NS3,SF4	8	9
40	99	99	99	99	99	99	99	99	99	-	-	-	NS1,RL2,NS3,SF4	7	9
41	99	99	99	99	99	99	99	99	-	-	-	-	NS1,PL2,NS3,NS4,PL5	7	9
42	99	99	99	99	99	99	99	99	-	-	-	-	SF1,PL2,PL3,NS4,RL5	7	8
43	99	99	99	99	99	99	99	99	99	99	-	-	NS1,PL2,NS3,SF4,RL5	6	8
44	99	99	99	99	99	99	99	-	-	-	-	-	RL1,SF2,NS3,PL4	7	9
45	99	99	99	99	99	99	99	99	99	-	-	-	RL1,SF2,NS3,SF4	7	9
46	99	99	94	98	100	100	100	100	-	-	-	-	NS1,RL2,NS3,RL4	6	8
47	95	96	96	98	98	98	98	98	-	-	-	-	RL1,SF2,NS3,RL4	6	9
48	98	98	98	98	98	98	98	98	98	-	-	-	PL1,RL2,NS3,PL4,SF5	8	10
49	99	99	99	99	99	99	99	-	-	-	-	-	SF1,RL2,NS3,PL4	6	9
50	99	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,PL4,RL5	9	9
51	99	99	99	99	99	99	99	-	-	-	-	-	PL1,RL2,NS3,SF4	9	9
52	99	99	99	99	99	99	99	99	-	-	-	-	NS1,SF2,PL3,NS4	7	9
53	98	98	98	98	98	98	98	98	98	-	-	-	NS1,RL2,NS3,RL4,NS5	7	9
54	97	93	98	100	100	100	100	100	100	100	-	-	PL1,NS2,NS3,RL4	8	9
55	100	100	100	100	100	100	100	100	100	100	-	-	NS1,NS2,RL3,NS4,SF5	6	7
56	99	99	99	99	99	99	99	-	-	-	-	-	NS1,RL2,NS3,SF4	7	9
57	100	100	100	100	100	100	100	100	-	-	-	-	NS1,PL2,RL3,NS4,PL5,NS6	7	9
58	99	99	99	99	99	99	99	99	-	-	-	-	RL1,NS2,NS3,RL4	6	9
59	100	97	97	97	99	99	99	-	-	-	-	-	NS1,RL2,SF3,PL4,NS5,PL6	6	8
60	100	100	100	100	100	100	100	100	100	-	-	-	NS1,RL2,RL3,NS4,SF5	8	9

SR NO.	Number of episodes of hypotension	Intervention for hypotension	Number of episodes of hypertension	Intervention done for hypertension	Number of episodes of bradycardia	Intervention done for bradcardia	Number of episodes of Nausea	Intervention done for nausea	Number of episodes of vomiting	Intervention done for vomiting	Dominant hand grip strength reading 1	Dominant hand grip strengt reading 2	Dominant and grip strength reading 3	Dominant hand grip strength mean value	Quality of recovery score
1	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	18	17.8	16.4	17.4	74
2	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	17.8	18.4	19.2	18.4	77
3	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	18.6	16.2	20.2	18.3	92
4	NONE	na	none	na	none	na	none	na	none	na	16.2	18.4	18	17.5	83
5	1	ephedrine 6mg	none	na	none	na	none	na	none	na	20.4	18.2	18.8	19.1	71
6	NONE	na	none	na	none	na	none	na	none	na	17.8	16.2	18.4	17.4	61
7	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	20.4	22.2	24.4	22.4	88
8	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	14.6	15.4	15.4	15.1	54
9	3	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	12.8	13.6	15.2	13.9	87
10	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	16.4	18.6	20.4	18.3	97
11	NONE	na	none	na	none	na	none	na	none	na	15.2	15.4	16.2	15.6	59
12	2	phenylephrine 30mg	none	na	none	na	1	emeset 4mg	none	na	13.2	14.8	13.6	13.8	38
13	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	20.2	19.6	22.2	20.6	89
14	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	24.8	26.2	28.2	26.4	101
15	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	20.4	24.2	24.4	23	95
16	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	19.2	22.4	20.6	20.7	82
17	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	24.2	24	23.2	23.6	85
18	NONE	na	none	na	none	na	none	na	none	na	25.3	26.4	22.8	24.8	101
19	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	30.2	29.8	29.6	29.8	69
20	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	22.2	19.8	19.2	20.4	90
21	NONE	na	none	na	none	na	none	na	none	na	23.6	24.3	25.3	24.4	88
22	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	21.2	18.4	20.3	19.9	61
23	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	1	na	23.2	25.4	21.6	23.4	56
24	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	24.5	25.6	22.2	24.1	72
25	NONE	na	none	na	none	na	none	na	none	na	24.2	23.7	28.5	25.4	97
26	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	30.5	26.8	24.8	27.2	68
27	NONE	na	none	na	none	na	none	na	none	na	39.4	36.8	33.2	36.4	68
28	NONE	na	none	na	none	na	none	na	none	na	45.2	46.4	42.4	44.6	89
29	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	44.2	40.8	36.2	40.4	76
30	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	36.2	34.4	28.6	33	77
31	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	20.8	21.4	23.5	21.9	95
32	1	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	20.6	28.2	24.4	24.4	72
33	NONE	na	none	na	none	na	none	na	none	na	36.8	32.4	33.4	34.2	81
34	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	30.8	35.6	38.2	34.8	68
35	NONE	na	none	na	none	na	none	na	none	na	48.4	44.2	46	46.2	95
36	NONE	na	none	na	none	na	none	na	none	na	46.8	44.2	48.6	46.5	99
37	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	24.6	26.2	22.4	24.4	81
38	3	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	19.8	18.6	20.8	19.8	73
39	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	30.8	34.6	36.2	33.8	92
40	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	36.2	32.8	34.4	34.4	59
41	NONE	na	none	na	none	na	none	na	none	na	30.5	31.2	29.6	30.4	82
42	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	43.4	42.2	45.6	43.7	91
43	NONE	na	none	na	none	na	none	na	none	na	42.4	40.2	42.6	41.7	89
44	2	Ephedrine 6mg	none	na	none	na	1	ondansetron 4mg	none	na	28.2	26.4	26	26.8	82
45	NONE	na	none	na	none	na	1	ondansetron 4mg	none	na	37.8	40.2	36.4	38.1	82
46	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	34.6	38.7	37.5	36.4	64
47	NONE	na	none	na	none	na	none	na	none	na	36.8	40.2	44.4	40.4	92
48	NONE	na	none	na	none	na	none	na	none	na	36.8	40.4	38.6	38.6	92
49	NONE	na	none	na	none	na	none	na	none	na	36.8	40.2	38.2	38.4	88
50	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	38.5	40.4	40.2	40.2	72
51	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	38.2	36.4	36	36.8	77
52	NONE	na	none	na	none	na	none	na	none	na	38.6	40.8	42.4	40.6	86
53	2	Ephedrine 6mg	none	na	none	na	none	na	none	na	19.8	23.6	24.5	22.6	73
54	NONE	na	none	na	none	na	1	ondansetron 4mg	none	na	19.3	17.6	21.2	19.3	91
55	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	19.5	24.2	25.8	23.1	82
56	NONE	na	none	na	none	na	none	na	none	na	30.2	33.4	35.6	33.4	86
57	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	18.2	19.4	20.6	19.4	66
58	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	28.4	30.8	26.8	28.6	75
59	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	12.8	13.2	14.4	13.3	81
60	1	Ephedrine 6mg	none	na	none	na	none	na	none	na	28.6	28.2	24	26.9	75

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No. BFUHS/2022p-TH/ 16

Date 4/1/2022

The Principal,
DMC, Ludhiana.

Subject: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Ankita Sharma,** a student of your college for **MD Anaesthesiology** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Role of preoperative carbohydrate loading for prevention of perioperative ketoacidosis in elective caesarean delivery.

Supervisor
Dr. Udeyana Singh
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The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

5. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
6. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF MEDICINE

In

ANAESTHESIOLOGY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

MARCH 2021

ANKITA SHARMA

DEPARTMENT OF ANAESTHESIOLOGY
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ABSTRACT OF PLAN OF THESIS

Title	ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY
For the degree of	M.D. Anaesthesiology
Name of the candidate	Dr. Ankita Sharma
Supervisor	Dr. Udeyana Singh, Associate Professor, Department of Anaesthesiology, DMCH, Ludhiana
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Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Post cesarean section, mothers are recovering from a surgery along with breastfeeding their babies. Undertaking this stress in a carbohydrate depleted state due to prolonged fasting leads to fatigue, negatively impacts cognitive functions, increases the risk of depression, worsens pain and may impair maternal- infant bonding. Hence, it affects the quality of recovery from the surgery and increases the length of hospital stay. Carbohydrate (CHO) rich drinks given preoperatively may ameliorate these deleterious effects. Many studies have observed the beneficial role of carbohydrate drink in elective gastrointestinal and hepatobiliary surgeries. However, evidence is scarce for a similar benefit in obstetric population.

Aim of Study: The aim of the study is to evaluate the role of preoperative carbohydrate (CHO) loading for the prevention of perioperative ketoacidosis in elective caesarean deliveries.

Materials & methods: A randomized study will be conducted on 120 ASA II or III parturients undergoing elective cesarean section under subarachnoid block (SAB). Parturients will be divided into two groups of 60 each. Group A: Parturients will receive 400ml of filtered water two hours prior to surgery. Group B: Parturients will be given non particulate carbohydrate drink (0.5 grams per kg of Glucon-D powder formulated in 400 ml of filtered water) two hours prior to surgery.
The incidence of ketonuria will be studied in both the groups immediately before giving sub arachnoid block. Results obtained will be statistically analyzed.

Clinical Significance: Use of preoperative carbohydrate drink may reduce the maternal metabolic stress, the incidence of urinary ketosis, improve glucose homeostasis, preserve post-operative muscle strength and hence improve the quality of recovery.
Keywords: Carbohydrate drink, urinary ketosis, insulin resistance,

(Signature)	(Signature) 01/03/2021	(Signature) 06/03/21	(Signature)
Candidate	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled "**ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY**" exist in the Department of Anaesthesiology at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

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APPROVAL PROFORMA
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Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
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Approved: Yes / No

Dr. Sandeep Puri
Chairperson
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Approved: Yes / ~~No~~

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PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

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4	DATE OF ADMISSION OF COURSE	25/07/2020
5	TITLE OF THE TOPIC	ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Patients are routinely fasted from midnight on the night before surgery despite ASA Guidelines recommending 8 hours of fasting for solids and 2 hours for clear liquids prior to elective surgeries. [1] Thus, patients invariably experience prolonged fasting resulting in catabolism, gluconeogenesis and rebound hyperglycaemia.

During prolonged fasting carbohydrate stores are rapidly depleted, leading to muscle catabolism, raised plasma free fatty acids and elevated urinary ketone body concentration.[2] Surgical stress results in insulin resistance leading to an exacerbation of existing postoperative catabolic state with marked loss of body fat and protein stores.[3,4]

Pregnant females are particularly not suitable for prolonged starvation since accelerated fasting occurs in the third trimester of pregnancy. It is because of the dilutional effects of the increased maternal circulating blood volume and increased glucose use by the fetus.[5] In addition, there is production of placental hormones including glucagon and human placental lactogen, which lead to insulin resistance by raising blood glucose metabolism and hence increasing the susceptibility to ketosis.[6] Postoperatively, mothers are recovering from a surgery along with breastfeeding their babies. Undertaking this stress in a carbohydrate depleted state leads to fatigue, negatively impacts cognitive functions, increases the risk of depression, worsens pain and may impair maternal- infant bonding. Hence, it affects the quality of recovery from the surgery and increases the length of hospital stay.[7]

A major component of the Enhanced Recovery After Surgery programme (ERAS) is the preoperative anabolic loading of the patient with a carbohydrate drink. ERAS involves various pre, intra and postoperative steps to reduce the normal stress response and organ dysfunction associated with surgical insult, with the ultimate aim of reducing time to full recovery. Preoperative carbohydrate treatment has shown to reduce the catabolic response to surgery, reduce insulin resistance and postoperative hyperglycemia. [8,9]

Many studies have been conducted to evaluate the effects of preoperative carbohydrate loading on glucose metabolism on patients undergoing gastrointestinal surgeries. Yuill et al [10] conducted a study on 72 patients undergoing major elective abdominal surgery wherein one group was given a carbohydrate drink prior to surgery and the other was given a placebo drink. Postoperative findings included higher insulin levels in patients given carbohydrate drink suggesting lesser insulin resistance indicating better glucose homeostasis and decreased hospital stay.

Noblett et al[11] conducted a randomized controlled trial on thirty-six patients undergoing elective colonic resection who were randomized into one of three groups. Group 1 were kept fasting; Group 2 were given pre-operative oral water, Group 3 received equivalent volumes of a Maltodextrin drink. Time to first flatus, first bowel movement and hospital stay were recorded. Muscle strength was measured pre-operatively, and on alternate days thereafter until discharge using a grip strength dynamometer. It was seen that the patients in the carbohydrate group had a median postoperative hospital stay of 7.5 days compared with 13 days in the water group and 10 days in the fasted group. The median time post surgery to first flatus was 3 days for both the fasted and water groups compared with 1.5 days in the carbohydrate group. First bowel movement occurred on day 3 in the carbohydrate group, day 4 in the fasting group and day 5 in the water group. The fasted group showed a significant reduction in postoperative grip strength with a median drop of 10% at discharge.

DK Bilku et[12] al in a systemic review of 17 randomized controlled trials (RCT'S) comprising of 1445 patients undergoing gastrointestinal, hepatobiliary or thyroid and parathyroid surgeries and found that the preoperative carbohydrate loading significantly improved insulin resistance and indices of patient comfort following surgery, especially hunger, thirst, malaise, anxiety and nausea. No definite conclusions could be made regarding preservation of muscle mass. Following ingestion of carbohydrate drinks, no adverse events such as apparent or proven aspiration during or after surgery were reported.

Though many studies in non-obstetric population have shown the benefits of carbohydrate preloading. However, studies evaluating similar benefits in obstetric population are few in scientific literature.

A. Clark and K Litchfield et al [7] studied the effect of preoperative carbohydrate loading on 209 parturients scheduled for elective caesarean section. They randomized the subjects into two groups. Women in both groups received pre-operative fasting instructions i.e. solids until midnight on the previous day and unlimited clear fluids overnight until 6hrs on the day of the delivery. Women in the carbohydrate (CHO) group received three sachets of preload, two to be consumed on the previous evening and the third at 6hrs on the day of the caesarean delivery. Each sachet of preload contained 47.5 g of carbohydrate in the form of dried glucose syrup derived from maize. The drink was prepared for consumption by dissolving the contents of each sachet in 400 mL of water. They observed that women receiving carbohydrate drink had a lower incidence (18.1%) of urinary ketones as compared to the group that was kept fasting which had a much higher incidence of urinary ketones (61.1%). Anxiety levels and hunger and thirst score were not significantly different.

This study was conducted on European females who are generally taller and have a higher body mass index (BMI). Little data is available regarding similar benefit of oral carbohydrate supplementation in Indian population. Thus, it is important to study the role of carbohydrate drink on the Indian counterparts to know if limiting preoperative fasting with a carbohydrate drink might reduce postoperative catabolism, urinary ketosis improve post-operative muscle strength, decrease post-operative hunger and improve the quality of recovery of the parturient.

6.2 REVIEW OF LITERATURE

Insulin resistance is a central metabolic change during surgical stress which is exaggerated by preoperative starvation. It causes hyperglycemia which leads to stimulation of various endocrine and inflammatory systems. This results in an exacerbation of the existing catabolic state with marked loss of body fat and protein stores. Thus, decreasing muscle strength. Additionally, insulin resistance has been shown to be an independent factor influencing quality of recovery and length of stay in hospital postoperatively. [3]

In order to reduce such deleterious effects of preoperative fasting, multiple studies were conducted to evaluate the effects of preoperative carbohydrate loading on the glucose metabolism as well as overall recovery of the patient.

A study was conducted by Yuill et al [10] who assessed patient tolerance and post-operative metabolic responses and the length of hospital stay. This was a prospective RCT done on 72 patients undergoing major elective abdominal surgery. These were divided into two groups, the control group received a placebo and the study group received an 800ml carbohydrate (CHO) drink on the preceding evening and a 400ml drink 2–3 hours prior to surgery. Post-operative findings included insulin of 9.7 units in the control group compared with 17.4 units in the CHO group (indicating reduced insulin resistance in the carbohydrate group). The CHO group had a lower average hospital stay (8 days vs 10 days).

Noblett et al [11] conducted a randomized controlled trial on thirty-six patients undergoing elective colonic resection who were randomized into one of three groups. Group 1 were kept fasting; Group 2 were given pre-operative oral water, Group 3 received equivalent volumes of a Maltodextrin drink. Time to first flatus, first bowel movement and hospital stay were recorded. Muscle strength was measured pre-operatively, and on alternate days thereafter until discharge using a grip strength dynamometer. It was seen that the patients in the carbohydrate group had a median postoperative hospital stay of 7.5 days compared with 13 days in the water group and 10 days in the

fasted group. The median time post surgery to first flatus was 3 days for both the fasted and water groups compared with 1.5 days in the carbohydrate group. First bowel movement occurred on day 3 in the carbohydrate group, day 4 in the fasting group and day 5 in the water group. The fasted group showed a significant reduction in postoperative grip strength with a median drop of 10% at discharge.

A similar study was conducted by Yagci et al [13] in a randomized controlled trial (RCT) of 70 patients either undergoing a laparoscopic cholecystectomy or thyroidectomy. They divided them into two groups out of which one group was given 800 ml of carbohydrate drink one night before surgery and 400 ml of carbohydrate drink on the morning of surgery. The control group was on overnight fasting. The primary outcome was the comparison of gastric ph in both the groups and the secondary outcomes were the analysis of levels of glucose and insulin in both the groups. No difference was observed in gastric emptying times between the two groups. Gastric ph was also comparable for both the groups. Serum insulin levels were elevated in the study group indicating a better glycemic control in the study group.

Thiswas supported by Mathur et al[14] who assessed the effect of oral carbohydrate (CHO) treatment on clinical outcome following major abdominal surgery. Primary outcomes were postoperative length of hospital stay and fatigue measured by visual analogue scale. They divided 69 and 73 in the CHO and placebo groups respectively. Postoperative changes in fatigue score from baseline did not differ between the groups. Median (range) hospital stay was 7 days in the CHO group and 8 days in the placebo group. Patients who did not receive epidural blockade or laparoscopic surgery (20 CHO, 19 placebo), the length of stay was 7 and 9 days respectively.

DK Bilku et [12] al in a systemic review of 17 randomized controlled trials (RCT'S) comprising of 1445 patients undergoing gastrointestinal, hepatobiliary or thyroid and parathyroid surgeries and found that the preoperative carbohydrate loading significantly improved insulin resistance and indices of patient comfort following surgery, especially hunger, thirst, malaise, anxiety and nausea. No definite conclusions

could be made regarding preservation of muscle mass. Following ingestion of carbohydrate drinks, no adverse events such as apparent or proven aspiration during or after surgery were reported.

Taken together these studies suggest that carbohydrate loading improves overall quality of recovery of the patient. However, most of these studies have been done in gastrointestinal surgeries. Very less evidence is present regarding similar benefit in caesarean deliveries.

A.Clark et al [10] did a randomized controlled trial on 209 parturients undergoing elective caesarean section (104 in standard care group and 105 in carbohydrate group). Women in both groups received pre-operative fasting instructions, i.e. solids until midnight on the previous day and unlimited clear fluids overnight until 6hrs on the day of the delivery. Women in the CHO group received three sachets of preload carbohydrate drink, two to be consumed on the previous evening and the third at 6hrs on the day of the caesarean delivery. The drink was prepared for consumption by dissolving 47.5grams of carbohydrate of each sachet in 400 mL of water.

The primary outcome was urinary ketone level, measured using reagent strips at the time of catheterization of urinary bladder prior to surgery. Secondary outcomes included dominant hand grip strength, anxiety score on Modified Beck anxiety scale, hunger thirst scores and length of hospital stay postoperatively.

It was observed that in the standard group 61% of the parturients had a positive urinary ketone test compared with 18% of the participants in the carbohydrate group. They suggested that women receiving carbohydrate drinks had a lower incidence of urinary ketones prior to caesarean deliveries, anxiety levels did not significantly differ between the two groups. Thirst and hunger scores as well as length did not significantly differ in both the groups.

P. Popivanov et al[15] conducted a study to assess the gastric emptying of preoperative carbohydrate drinks in term parturients before elective caesarean delivery using ultrasonography. A total of 40 participants was analyzed. The primary outcome was the time taken for participants to return to a qualitative fasted Perlas grade of 0 (empty stomach) or 1

(negligible fluid 16-36ml). Secondary outcomes included quantitative antral cross-sectional area at 120 min and calculated gastric volumes. It was seen that 80% parturients attained Perlas grade 0 at 100 min of consuming the drink and thus considered at a low risk of gastric aspiration. Gastric emptying of this cohort of pregnant women suggested that 400 ml of a carbohydrate drink could be safely consumed upto two hours before elective surgery.

Wendling A. et al [5] assessed the impact of oral carbohydrate consumption prior to caesarean delivery on preoperative well being of the parturient. They recruited 47 low risk parturients scheduled for elective caesarean section under sub arachnoid block who were randomized into three groups. One group received a clearfast (high carbohydrate drink) beverage, the other received Gatorade (oral rehydration solution- low carbohydrate drink) beverage the night before surgery and 355ml 2 hrs prior to surgery. Parturients in the control group were kept fasting after midnight. Patient well being was recorded using visual analogue scale 2 hrs before surgery and repeated after an hour. Secondary outcomes included cord blood glucose level, intraoperative haemodynamics, breastfeeding success and a quality of recovery assessment administered one day after surgery. It was observed that both the beverage consuming groups showed significant improvements in patient well being using visual analogue scales while control group showed no change. The group consuming higher dose carbohydrate beverage had lesser hunger scores as compared to oral rehydration beverage group. There was no difference in the cord blood glucose level as well as the cardiovascular function amongst the groups.

Taken together these studies suggest a beneficial role of the carbohydrate drink in improving the quality of recovery in patients undergoing surgery. But more study needs to be done in obstetric population regarding their metabolic response to the drink, perioperative hunger and thirst scores, preservation of postoperative muscle strength and faster recovery from the catabolic state associated with surgery.

6.3 AIMS AND OBJECTIVES OF THE STUDY

To evaluate the role of preoperative carbohydrate loading on the perioperative ketoacidosis in elective caesarean deliveries.

7. MATERIALS AND METHODS

7.1 **SOURCE OF DATA**

A randomized study will be conducted in the department of Anaesthesiology DMC&H Ludhiana after approval by Institutional Ethics Committee on a total of 200 parturients undergoing lower segment caesarean section (LSCS) under subarachnoid block (SAB), who would be randomly allocated into two groups of 100 parturients each by computer generated randomized codes contained in sealed, sequentially numbered envelopes. A written informed consent will be obtained from each patient

7.2 METHOD OF COLLECTION OF DATA

Inclusion Criterion

- American society of anaesthesiologists (ASA) physical status II and III undergoing elective lower segment caesarean section under subarachnoid block.
- Healthy singleton pregnancy
- Age more than 18 years.
- Weight 50-100kg

Exclusion Criterion

- Diabetic parturients
- Parturients with severe gastro-oesophageal reflux disease
- Parturients with failed subarachnoid block (SAB) or planned general anaesthesia (GA).
- Severe cardiovascular or cerebrovascular disease in mother
- Known fetal abnormality
- Anticipated excessive intraoperative blood loss.
- Patients with previous gastrointestinal surgery.

Group allocation

We shall be enrolling 220 parturients for the study to account for 10% dropout rate. After recruitment, they shall be randomized using random computer-generated numbers into two groups to receive either of the following:

Group A: Parturients will receive 400ml of filtered water two hours prior to surgery.

Group B: Parturients will be given non particulate carbohydrate drink (0.5 grams per kg of Glucon-D powder) formulated in 400 ml of filtered water two hours prior to surgery.

Preanaesthetic checkup

A thorough pre anaesthesia checkup will be done comprising of detailed history, comorbidities, allergy to any drug being used, general physical and systemic examination. Detailed history will be taken regarding diabetes and gastro-esophageal reflux disease.

Parturients will be explained about the study being conducted and written informed consent will be taken. All parturients will be advised to be nil orally for 8 hours for solid prior to scheduled time of surgery. Blood sugar will be measured immediately before giving the drink.

Parturients in group A will be given 400ml of filtered water as placebo two hours prior to surgery. While parturients in group B will be given 0.5gram/kg of carbohydrate in the form of a drink which will be formulated by adding the Glucon-D powder (as calculated) in 400ml of filtered water to make a clear drink. They will be asked to consume it within half an hour, two hours before entering the operation theatre. This administration of either filtered water or carbohydrate drink will be supervised or monitored by the attending anaesthesiologist. After the administration of the oral drink an 18G iv cannula will be secured and balanced salt solutions will be initiated.

Anxiety score will be measured in all the parturients on a Modified Beck Anxiety Scale [16] immediately before entering the operation theatre (OT).

Hunger and thirst scores will also be assessed prior to entry into the OT on a Numeric rating scale(NRS) by asking the parturient to rate hunger/thirst on a scale of 0-10; 0 being no hunger or thirst and 10 being hungriest or thirstiest they have ever felt.

Dominant hand grip strength will be measured by taking the mean of three readings using an electronic dynamometer (Camry 200lbs or 90kgs digital hand dynamometer) immediately prior to entering the

operating room. Random blood sugar (RBS) will also be measured again at this time.

Anaesthesia technique

On arrival in the operating room parturient will be positioned on the operating table in supine position with a 15-30 degree left lateral tilt. Monitors will be placed in the form of pulse oximeter, noninvasive blood pressure (NIBP) and a five lead ECG. Heart rate will be recorded using 5 lead electrocardiography and noninvasive blood pressure using an automated noninvasive device that will be cycled every 1 min till three consecutive measurements of systolic blood pressure are recorded with a difference of not more than 10%. We will then calculate the mean value of heart rate and blood pressure which will be defined as baseline value.

Parturients will then be positioned in sitting or lateral position for subarachnoid block. After full aseptic precautions and skin infiltration with lignocaine hydrochloride 2% (w/v), a 26G Quincke's needle will be inserted in L3-L4 or L4-L5 vertebral interspace. After confirmation of free flow of cerebrospinal fluid, a total of 2.5 ml of intrathecal drug comprising of 2ml (10mg) of hyperbaric bupivacaine and 0.5ml (25mcg) of fentanyl will be injected intrathecally.

Parturient will be catheterized with foley's catheter and 5ml of urine will be collected to assess the urinary ketone levels using reagent strips or dipstick method, which will be documented.

After a sensory level of T4 is achieved, as assessed by hot or cold method, surgery will be allowed to proceed. Systolic blood pressure will be maintained within 5% of baseline value at all times during surgery with a combination of fluid coloading with balanced salt solutions 10ml/kg over 5-10 minutes and phenylepherine 50mcg or ephedrine 6mg boluses.

Blood pressure, heart rate, SpO_2 reading will be measured every one min till the delivery of the baby and thereafter every 5 min till the skin closure. APGAR score will be calculated at 0,1 and 5 min of birth of the baby.

At the end of the surgery, the surgical incision will be infiltrated with 40ml of 0.2% Ropivacaine (isobaric). Post-operative analgesia regimen will consist of:--Injection tramadol 1-1.5mg/kg intravenously every 8 hours.

-Injection paracetamol 10mg/kg intravenously 6 hourly infused over 15 minutes.

-Diclofenac patch 200mg (Nupatch200) applied over the abdomen

-Any breakthrough pain will be treated by injection fentanyl 2ug/kg intravenously.

RBS will be measured again immediately after shifting the parturient to the recovery.

Postoperatively Quality of recovery score will be measured after 24hours of the surgery using ObsQoR-11 score. [17]

Muscle strength will be measured using hand dynamometer 24 hours postoperatively.

PRIMARY OUTCOME:

Measurement of urinary ketone levels using reagent strips as a marker of postoperative catabolic state.

SECONDARY OUTCOMES:

- Hunger and thirst scores immediately before entering the operative room
- Anxiety score on Modified Beck's scale.
- Dominant hand grip strength using electronic dynamometer .
- Quality of recovery score postoperatively using ObsQoR-11 score

Statistical Analysis

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test will be performed and exact test was used when the expected frequency is less than 5. A probability value (p value) less

than 0.05 will be considered statistically significant. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

SAMPLE SIZE

A post hoc power analysis was conducted using the software package, G*Power version 3.1.9.2 (Franz Faul, university kiel, Germany). The alpha level used for this analysis was $p<0.05$ and beta was 0.20. Sample size was estimated from the results of previous study[7] using the incidence of Urinary Ketone levels as the parameter, which is the primary outcome of our study. Our sample size came out to be 100 subjects per group at power of 0.99 and with an effect size of 1.55 with 10% chance of error with $\alpha = 0.05$, $\beta = 0.20$ and confidence interval of 95%.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS ? IF SO, PLEASE DESCRIBE BRIEFLY.

The study does not require any investigation or intervention other than those routinely done for every parturient for lower segment caesarean section

7.4 HAS ETHICAL CLEARENCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached herewith

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PROFORMA

SR. No. Age:

MRD No.

Height: Weight:

History of drug intake/ allergy:

ASA Grade:

Indication of caesarean section:

General Physical Examination:

Level of consciousness: Build and nutrition:

Pulse rate: SBP: DBP: MAP:

RR: Temperature: Spine:

Investigations:
Haemogram including platelet count:

Any other relevant investigations required:

OBSERVATIONS :

PREOPERATIVE-

Duration of fasting (hours) =

RBS (mg/dl)

Before CHO drink	Immediate pre-op	Immediate postop

Hunger and thirst score calculation on a numeric rating scale (NRS)

0	none	
1-3	mild	
4-6	moderate	
7-9	severe	
10	uncontrolled	

Signature of Candidate **Signature of Supervisor**

Dominant hand grip strength in kg:

Reading 1=
Reading 2=
Reading 3=
Mean=

Anxiety score on Modified beck's scale =

Beck Anxiety Inventory

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____.

- **Urine ketone levels- using reagent strip or dip stick method:**

Negative	
1+	
2+	
3+	

Signature of Candidate **Signature of Supervisor**

INTRAOPERATIVE OBSERVATIONS:

	HR	SBP	DBP	MAP	SPO2	VASOPRESSOR BOLUS	FLUIDS GIVEN I/V
BEFORE ADMINISTRATION OF SAB							
1 MIN							
2 MIN							
3 MIN							
MEAN OF 3 VALUES AS BASELINE							
AFTER ADMINISTRATION OF SAB							
1 MIN							
2 MIN							
3 MIN							
4 MIN							
5 MIN							
6 MIN							
7 MIN							
8 MIN							
UPTO TIME OF DELIVERY OF BABY							
EVERY 5 MIN POST DELIVERY OF BABY							

Signature of Candidate

Signature of Supervisor

INTRAOPERATIVE EVENTS:

EPISODES OF :	NUMBER	INTERVENTIONS, iF ANY
1. Hypotension		
2. Hypertension		
3. Bradycardia		
4. Nausea		
5. Vomiting		

POST OPERATIVE-

Dominant hand grip strength in kg:

Reading 1=
Reading 2=
Reading 3=
Mean=

Quality of recovery score=

Quality of recovery score following Caesarean delivery (ObsQoR-11)

How have you been feeling in the last 24 h?
(0–10, where 0=very poor and 10=excellent)

	Strongly Disagree ⟷ Strongly Agree										
1. I have had moderate pain.	10	9	8	7	6	5	4	3	2	1	0
2. I have had severe pain.	10	9	8	7	6	5	4	3	2	1	0
3. I have had nausea or vomiting.	10	9	8	7	6	5	4	3	2	1	0
4. I have been feeling dizzy.	10	9	8	7	6	5	4	3	2	1	0
5. I have had shivering.	10	9	8	7	6	5	4	3	2	1	0

	Strongly Disagree ⟷ Strongly Agree										
6. I have been comfortable.	0	1	2	3	4	5	6	7	8	9	10
7. I am able to mobilise independently.	0	1	2	3	4	5	6	7	8	9	10
8. I can hold baby without assistance.	0	1	2	3	4	5	6	7	8	9	10
9. I can feed/nurse my baby without assistance.	0	1	2	3	4	5	6	7	8	9	10
10. I can look after my personal hygiene/toilet.	0	1	2	3	4	5	6	7	8	9	10
11. I feel in control.	0	1	2	3	4	5	6	7	8	9	10

Global health score

Please mark with an arrow or a cross on the scale below how you have been feeling in the last 24 h:

Worst imaginable health state — Best imaginable health state

0 10 20 30 40 50 60 70 80 90 100

Signature of Candidate **Signature of Supervisor**

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....
.....am willing to participate in the study **"ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY"**The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

.....
Signature of the patient

Name:

Signature of Supervisor

Signature of Candidate

मरीजअनुमतिफार्म

तिथि_____

मैं_____पत्नी/पुत्र/पुत्री_____

निवासी_____

इसशोधकार्य**"ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREAN DELIVERY"** " में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाहकेहस्ताक्षर रोगीकेहस्ताक्षर/अंगूठेकानिशान

नाम: नाम:

_____

अन्वेषक केहस्ताक्षर

_____

विद्यार्थीकेहस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____ਵਾਸੀ _____**"ROLE OF PREOPERATIVE CARBOHYDRATE LOADING FOR PREVENTION OF PERIOPERATIVE KETOACIDOSIS IN ELECTIVE CAESAREANDELIVERY"** ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

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ਗਵਾਹਦੇਹਸਤਾਖਰ ਮਰੀਜ਼ਦੇਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

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ਨਿਰੀਖਕਦੇ ਹਸਤਾਖਰ

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ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ